Year 9 Summer Term 1 Timetable and Scheme of Work.

Y9 Half term 1	Topic Studied
1	P3 Energy Resources
2	C13 Earth's Atmosphere

· At the end of year 11, students will be sitting the Combined Science Trilogy GCSE from AQA. The specification can be found here: https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464

· During this summer term, students will be learning about the topics outlined above.

· The scheme of work below is what students would follow if they were in school and is based on the Oxford University Press 5 year curriculum.

· We will aim to set tasks following this lesson by lesson structure however many of the activities will be different for home learning however they may give you some ideas on how to take your learning further.

GCSE Physics P3 Energy Resources			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
The supply and demand of electrical energy	**Knowledge** • List several methods of generating electricity • List some advantages and disadvantages of each method of generating electricity • Define renewable, non-renewable, carbon-neutral	Understanding that the power of the wind is equal to V^3 through use of previously learnt equation on kinetic energy.	BBC Bitesize Doddle – power points and quick quizzes You tube: 'Free science lessons' Seneca learning platform

	Understanding • Describe the sequence of generating electricity for a number of methods (identify what they all have in common) • Evaluate method of generating electricity (also considering the methods versatility in always meeting energy demands and cost) • Select methods of generating electricity most appropriate to given situation and justify answers **Skills** • Writing to justify, evaluate, examine, critique and review	Individual additional research into the topic to consider the effectiveness of case studies – wind farms off the East Coast of England for example. Model, design, built their own method of generating electricity and evaluate its usefulness as a source of electrical energy. Individual research project on the current energy providers, their charges and methods of generating electricity and justify which is currently the best provider.	Microsoft Teams Assignment

Scheme of Work 2020-2021

Subject: GCSE Science: P3 Energy Resources

Year Group: 9

Specification: AQA Combined Science Trilogy

Skill focus: 21

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
P3.1 Energy demands	**Aiming for Grade 4 LOs:** • Identify which fuels are renewable and which are non-renewable. • Identify activities that require large energy transfers. • Describe biofuels as carbon neutral whereas fossil fuels are not. **Aiming for Grade 6 LOs:** • Outline the operation of a fossil fuel burning power station. • Outline the operation of a nuclear power station. • Explain why biofuels are considered carbon neutral.	Is it worth harvesting lightning from lightning storms? How do we provide electricity for a nation? France has more nuclear power stations that us – are they more environmentally friendly?	**Starters** **Fossil fuels** (5 min) Students use the interactive to put in order statements that describe how coal, oil, and natural gas are formed. **The burning question** (10 min) Students draw a spider diagram or visual summary covering what they know about combustion of fuels. They can do this whilst watching a birthday candle burn, stopping when the candle is finished. Choose a candle that will last for a few minutes. **Main** **Burning fuels for energy** (25 min) Begin with an explanation of the very high energy demands of developed countries and ask the students about what they already understand about how these needs are met. Discuss which activities may be responsible for the very large energy demands, such as transport and heating of homes. Show students the structure of a conventional (fossil fuel) power station, supported with animations or video clips where	QnA between teachers and students Written responses to questions Class discussion	Learn the keywords for this topic: Fossil fuels Coal Oil Gas Nuclear Renewable Biofuels Ethanol Carbon-neutral Reactor core Methane Megajoules Wind Wave Hydroelectric Generator Marine Turbines	M10 SO2 SO6 SP9 C4 C1 C5 SO2 C1 C5 SP9

	Aiming for Grade 8 LOs: • Compare energy use from different sources and different societies from available data. • Compare fossil fuels and nuclear fuels in terms of energy provided, waste, and pollution. • Discuss some of the problems associated with biofuel use and production.	Is the fear or nuclear power stations justified?	possible. Demonstrate the combustion of a biofuel (e.g., ethanol) whilst discussing how it is produced. Place emphasis on the carbon neutral nature, identifying photosynthesis and combustion and the key processes. Explain how the process of burning a fuel is used to produce electricity. **Nuclear power** (15 min) Outline the operation of a nuclear power plant, noting the different heating processes taking place in the core with much of the rest of the plant similar to fossil fuel power plants. A quick comparison of nuclear and fossil fuels should be made. **Plenaries** **Anagrams** (5 min) Ask students to decipher anagrams of important key words from this lesson. Add a few more about energy resources to see if the students can figure them out. Students then define each key term.		Tidal National grid Geothermal Solar Electricity Radioactive Absorb Volcanic Reliability Doddle: Release of energy during combustion animation In which state is each element in combustion animation	SP6 M2
P3.2 Energy from wind and water	**Aiming for Grade 4 LOs:** • State that wind turbines, wave generators, hydroelectric systems, and tidal systems are renewable energy resources. • Describe some simple advantages or disadvantages of renewable energy systems. • Outline the operation of a renewable energy source.	Could generating electricity from wind and water	**Starters** **Wind and convection currents** (5 min) Ask students to suggest the cause of wind in the atmosphere. **Water cycle recap** (10 min) Students use the interactive to label a diagram of the water cycle with the key words evaporation, condensation, and precipitation. They then choose the correct words to complete sentences that explain how the water cycle is linked to hydroelectricity. **Main**	QnA between teachers and students Written responses to questions Class discussion 6 mark evaluation on the advantages and	Doddle: Energy Resources presentation, worksheet and mini quiz	M2 M10 SP9 SP6 SP5 C1 C4 C5 S06

	Aiming for Grade 6 LOs: • Describe the operation of a wind farm. • Describe the operation of a hydroelectric system. • Suggest the most appropriate energy resource to use in a range of scenarios. **Aiming for Grade 8 LOs:** • Compare the operation of hydroelectric, wave, and tidal systems in terms of reliability, potential power output, and costs. • Explain in detail the purpose, operation, and advantages of a pumped storage system. • Justify the choice of an energy resource by using numerical and other appropriate data.	replace fossil fuels? Towns for electricity – is it ok to sacrifice towns for hydroelectric power? https://www.telegraph.co.uk/travel/news/turkey-hasankeyf-ilisu-dam-underwater-ghost-towns-lost-cities/	**Wind and wave power** (20 min) Show a video clip of a wind farm and ask students to explain what is happening. Link back to the idea of a turbine generating electricity. Carry out the simple practical to investigate wind turbines. Discuss the advantages and disadvantages of wind power including its' renewable nature. Discuss the operation of a simple system ensuring the students are clear on some of the advantages and disadvantages. **Hydroelectric and tidal power** (20 min) Explain how a water turbine works and discuss the energy transfers involved, linking back to the idea of gravitational potential energy stores. Include a discussion of a pumped storage system, ensuring that the students know that, although these systems are not efficient, they allow some of the excess power produced at night by the base load of the network to be used usefully renewability should be addressed. Tidal power can be linked to the hydroelectric systems but with a different supply of water – the tides. **Plenaries** **Local solutions** (10 min) Give students some example towns and their local environments. Students should decide which of the systems covered today would best suit each town, and determine if the systems are a better solution to local needs than a fossil fuel power station. **Wind farm controversy** (5 min) Ask students to suggest why local communities may campaign against wind farms.	disadvantages of hydroelectric power		

P3.3 Power from the sun and the earth	**Aiming for Grade 4 LOs:** • Explore the operation of a solar cell. • Describe one difference between solar cells and solar heating systems. • State that radioactive decay is the source of heating in geothermal systems. **Aiming for Grade 6 LOs:** • Compare and contrast the operation of solar cells (photovoltaic cells) with solar heating panels. • Describe the operation of a solar power tower. • Describe the operation of a geothermal power plant. **Aiming for Grade 8 LOs:** • Analyse the power output of a variety of energy resources. • Calculate the energy provided by a solar heating system by using the increase in water temperature. • Plan in detail an investigation into the factors that affect the power output of a solar cell.	Are solar panels the answer to our energy needs? Icelands hot rocks- tourist attraction or energy solution? Heliotropism – what is is and what could we learn from it? What plant adaptation could we apply to improve solar panel efficiency?	**Starters** **Old Faithful** (10 min) Show a video clip of 'Old Faithful' and ask students if they have ever seen a geyser and if they know what causes geysers. Ask them to explain why the water is so hot. **To the centre of the Earth** (5 min) Interactive where students label a simple diagram showing the layers of the Earth (crust, mantle, and core). They then match each layer with its properties. They should be aware that the outer core is a molten layer and that the centre of the Earth is very hot. **Main** **Using solar cells** (30 min) Students use the practical to investigate the operation of a solar cell. They can measure the effect of reducing the area exposed to light on the current and voltage output, and the effect of increasing the light level by moving a lamp closer or further away. **Solar and geothermal heating systems** (10 min) Remind students about the ideas around heating and the temperature rise caused by absorbing infrared radiation. Discuss the renewable nature of geothermal systems. Students can struggle to remember the heating source in geothermal systems, so emphasise the radioactive decay. Students should compare systems that use high pressure steam with ones that simply provide hot water for direct heating. **Plenaries** **Solar car** (5 min) Ask students to list the advantages and disadvantages of the design of solar cars. **Keep cool** (10 min) Ask students to produce a design for a device that keeps them cooler, the brighter the Sun is. A solar powered fan is a typical design but colour-changing clothing is a possibility with smart materials (white on the side that faces the Sun but black on the opposite side).	QnA between teachers and students Written responses to questions Class discussion 6 mark descriptive piece on how solar panels generate electricity (HT)	Doddle: Energy Resources presentation, worksheet and mini quiz	M2 M10 SP9 SP6 SP5 C1 C4 C5 S06

P3.4 Energy and the environment	**Aiming for Grade 4 LOs:** • List some environmental problems associated with burning fossil fuels. • Identify the waste products of fossil fuels and nuclear fuel. • Describe simple advantages and disadvantages of a variety of renewable energy resources. **Aiming for Grade 6 LOs:** • Describe the effects of acid rain and climate change. • Describe techniques to reduce the harmful products of burning fossil fuels. • Compare a wide range of energy resources in terms of advantages and disadvantages. **Aiming for Grade 8 LOs:** • Evaluate methods of reducing damage caused by waste products of fossil fuels and nuclear fuels. • Discuss in detail the problems associated with nuclear accidents and the public perception of nuclear safety. • Evaluate the suitability of an energy resource for a range of scenarios, taking into account a wide range of factors.	What are the future solutions to our energy needs? What would you need to know before deciding on the best method for a town or village? How is the energy crisis developing technology? Is the energy crisis good for business? (an opportunity or a hindrance?)	**Starters** **Renewable or not?** (5 min) Give students a list of energy resources and ask them to sort the resources into either renewable or non-renewable. Use coal, oil, natural gas, and uranium for non-renewable resources and tidal, solar, geothermal, wind, wave, and biofuel for renewable resources. **Acid rain** (10 min) Demonstrate the acidity of rainwater with universal indicator and ask students to explain what causes this acidity. **Main** **The problems with fossil fuels** (20 min) Cover the range of problems with fossil fuels, making sure that the students do not confuse the problems of acid rain and climate change. There is scope here to discuss some of the problems associated with climate change, or this can form a larger part of the debate in Topic P3.5. A simple discussion of the advantages or disadvantages of renewable systems should take place. Students can compile this information in preparation for the debate in Topic P3.5. **Nuclear power** (20 min) Recap on the differences between nuclear fuel and other fuels – no combustion and so no carbon dioxide or sulfur dioxide. This leads to discussion of the alternative problems with the waste. Discuss the Chernobyl disaster and its effects but also link to more recent accidents such as Fukushima Daiichi. Emphasise the fact that accidents are rare but very significant. **Plenaries** **What's the problem?** (5 min) Students use the interactive to match environmental problems with their likely causes. **Energy resource crossword** (10 min) Students create a crossword that includes all of the key words covered so far in this chapter. They then swap and complete a partner's.	QnA between teachers and students Written responses to questions Class discussion Mini white board to spot renewable and non-renewable ways of generating electricity. Free writing piece – letter to local council to persuade them to stop burning coal.	Doddle: Energy Resources presentation, worksheet and mini quiz	M2 M10 SP9 SP6 SP5 C1 C4 C5 S06 S07

GCSE Chemistry C13 The Earth's Atmosphere			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
How Earth's atmosphere has changed over time and the current impacts of the human population on it.	**Knowledge** • Composition of the Earth's atmosphere today and historically • Define 'locked up' carbon • Name greenhouse gases • List factors increasing the global warming **Understanding** • Explanation of how the Earth's atmosphere has changed over time • Explain the causes and processes of global warming • Evaluate the extend of global warming • Suggest to what extend we will be able to reduce global climate change **Skills** • Writing to compare • Critically evaluate and synthesis evidence to justify claims	Links to previous topics on photosynthesis and respiration Evaluating alternative theories of the historic composition of the Earth's atmosphere or comparing it to other planets in the solar system Independent research on how greenhouse gases can be monitored using infrared spectroscopy.	BBC Bitesize Doddle – power points and quick quizzes You tube: 'Free science lessons' Seneca learning platform Microsoft teams assignments

Scheme of Work 2020-2021

Subject: GCSE Science: C13 The Earth's Atmosphere

Year Group: 9

Specification: AQA Combined Science Trilogy

Skill focus: 20d,21

Lesson No	Topic & Objectives	Big Question – What will	Key Activities & Specialist Terminology (Do Now Task / Starter/Tasks/Plenary	Planned Assessment	Homework or flipped learning resources	Lit Num

		students learn?			DODDLE resources	SMSC Codes
C13.1 History of our atmosphere	**Aiming for Grade 4 LOs:** • Describe the Earth's early atmosphere. • Describe how oxygen was formed in the development of the atmosphere. **Aiming for Grade 6 LOs:** • State the composition, including formulae, of the Earth's early atmosphere. • Describe a theory for the development of the Earth's atmosphere. • Explain, using word equations, how gases were formed in the atmosphere and how oceans were formed. **Aiming for Grade 8 LOs:** • Use a theory to explain in detail how the atmosphere developed. • Explain the limits of the theory for the development of the Earth's atmosphere and why it has changed. • Use balanced symbol equations to explain how gases were formed in the atmosphere and explain how oceans were formed.	Where would we be without cyanobacteria? What has our old atmosphere got in common with Jupiter's moons? Could we alter the atmosphere of other planets until they were able to support life?	**Starters** **Photosynthesis** (5 minutes) Ask students to write an equation for photosynthesis and explain the importance of this chemical reaction to life on Earth. **Photosynthesis and the atmosphere** (10 minutes) Students choose the correct words to complete the word and balanced symbol equations for photosynthesis. They then put the different stages in the development of the atmosphere in the correct order. **Main** **Gases in the atmosphere** (40 minutes) Ask students to set up the equipment as outlined in the practical box. Students should write a prediction about what they think will happen, why, and what they think the results of the gas test will be. Then ask students to make a timeline to describe the key stages in the development of the Earth's atmosphere. Students could have access to text books and the Internet for research. You may need to revisit the practical in another lesson. **Plenaries** **Atmosphere ordering** (5 minutes) Show an artist's impressions of the Earth and its atmosphere in each of the key stages of the theory outlined in the student book. Students order the images. **Atmosphere marks** (10 minutes) Show students an exam question with candidate-style answers. Ask students to annotate the script with examiner-style comments. Then reveal the actual marks awarded and comment on any misconceptions and examination technique. Alternatively, students answer the exam question, swap answers, and mark each other's, using the mark scheme.	QnA between teachers and students Written responses to questions Class discussion	Learn the keywords for this topic: Atmosphere Volcanic Methane Ammonia Photosynthesis Ammonia Greenhouse Infrared Radiation Reflected Short wavelength Absorb Molecules Global climate Fossil fuel Ecosystem Economies Carbon footprint Capture Pollution Fuels Monoxide Impurities Sulphur dioxide Acid rain Particulate Global dimming Incomplete combustion Nitrogen oxides Hydrocarbons Haemoglobin	So3 C3 Sp2 Sp9

C13.2 Our evolving atmosphere	**Aiming for Grade 4 LOs:** • State that the levels of carbon dioxide have decreased in the atmosphere. • List the names and symbols of the gases in dry air. • State where methane and ammonia in the atmosphere may have come from. **Aiming for Grade 6 LOs:** • Describe how the proportion of carbon dioxide in the early atmosphere was reduced. • State the composition of dry air. • Use word equations to show how carbon dioxide can form sedimentary rocks. **Aiming for Grade 8 LOs:** • Use a theory to explain in detail how the early atmosphere developed to form the atmosphere today. • Explain why the composition of the Earth's atmosphere has not changed much for 200 million years. • Use balanced symbol equations to explain how carbon dioxide forms sedimentary rock and how	What evidence is there that carbon is 'locked' into the shells of sea creatures? Are 'fossil fuels' really made from fossils?	**Starters** **What is the connection?** (5 minutes) Split the class into small groups of around three students. Show (or give) each group small samples of chalk, limestone, marble, and a bottle of calcium carbonate. Ask students to suggest the connection. **Gases in dry air** (10 minutes) Students match atmospheric gases with the percentage they make up of the atmosphere. They then complete a crossword to summarise what they know already about the atmosphere. **Main** **Shelly carbonates** (30 minutes) Explain to students that carbon in fossilised bones and shells can be trapped in sedimentary rocks in the form of the chemical calcium carbonate. Ask students to suggest a simple chemical test that they could use to show that a rock is a carbonate. Then allow students to complete the practical as outlined in the practical box to test samples of rocks to determine which contain carbonates. **Composition of air** (10 minutes) Give students the spec link 9.1.1 as detailed. Ask students to write this data in a table, as a percentage, a fraction, and a decimal. Then ask students to draw a pie chart of the data. **Plenaries** **Atmosphere gas taboo** (10 minutes) Assign each student a gas that has, at some point, been found in the Earth's atmosphere. Give students one minute to produce a list of three words that can be used to describe it. Then split students into small groups and students take it in turns to describe their gas without using the words they have produced. The other students try to guess the gas. **Gas flow chart** (10 minutes) Ask students to make two flow charts which show how carbon dioxide and nitrogen were made in the early atmosphere and any processes which have occurred that have changed their composition in the atmosphere. Students should include equations and percentage compositions.	6 mark question on how our atmosphere has changed over time 6 mark comparison question between the Early and current atmosphere	Doddle: Earth's Atmosphere presentation Microsoft teams assignments	So3 C3 Sp2 Sp9

	methane and ammonia were removed from the atmosphere.					So3 C3 Sp2 Sp9 So7 C2
C13.3 Greenhouse gases	**Aiming for Grade 4 LOs:** • Describe the greenhouse effect. • Name three greenhouse gases • State some human activities that affect the proportion of greenhouse gases in the atmosphere. **Aiming for Grade 6 LOs:** • Explain the greenhouse effect • Explain how greenhouse gases increase the temperature of the atmosphere. • Explain how human activity can change the proportion of greenhouse gases in the atmosphere.	Is global warming real? Greenhouse gases are necessary for life– justify? How do greenhouse gases increase Earth's temperature?	**Starters** **Climate change** (5 minutes) Show students a dot and cross diagram of water, a ball and stick diagram of methane, and the molecular formula of carbon dioxide. Ask students to identify the compounds and suggest the topic of the lesson. Students then sort statements on global warming and climate change according to whether they are true or false. **Greenhouse gases** (10 minutes) Set up the experiment to consider the effect of greenhouse gases. Ask students to predict what will happen to the temperature of each flask and to suggest why they think this. **Mains** **Climate change?** (30 minutes) Scientists at the University of East Anglia's Climate Research Unit have provided data to show that climate change can be linked to human activity. However, other researchers feel that climate change may not be due to human activity. Ask students to write their conclusion which is backed up by their research. If the Internet is available students should	QnA between teachers and students Written responses to questions Class discussion	Doddle: The Greenhouse Effect Presentation and Worksheet What are the products of combustion animation Microsoft teams assignments	

	Aiming for Grade 8 LOs: • Justify why scientists, as well as the public, disagree about the cause of climate change. • Explain the difference between global warming and the greenhouse effect. • Evaluate evidence to suggest if global warming is man-made or natural.		research arguments for and against climate change affected by human activity. **Compare and contrast** (10 minutes) Give students an A4 sheet of paper and ask them to fold it in half to have two A5 sections. One should be marked Greenhouse effect (natural) and the second Global warming or enhanced greenhouse effect (man-made). Ask students to draw a labelled diagram to explain each phenomenon. **Plenaries** **Greenhouse gases** (5 minutes) Look at the experiment and note that both flasks have had an increase in temperature of the water due to the heat lamp. However, the methane-filled flask has heated up more quickly. Please note, if you are measuring how long it takes to reach a specific temperature, you will need to use a data logger. However, if you are expecting the methane flask to be hotter, then you just need a thermometer **What is happening to Earth?** (10 minutes) Read out statements and ask students to put their thumbs up for true statements and thumbs down for false statements. Students could also label the key features of the greenhouse effect in a diagram.			So3
C13.4 Global climate change	**Aiming for Grade 4 LOs:** • List some of the possible outcomes of climate change. • State a definition for carbon footprint. • List some ways to reduce a carbon footprint.	Who cares if the temperature gets a bit hotter – I would like more sunshine in England!	**Starters** **Polar ice** (5 minutes) Show an image of the extent of the polar ice caps in 1800, 1900, 2000, and the present day. Ask students to speculate what the images show. Ensure students can distinguish between the enhanced greenhouse effect and depletion of the ozone layer by CFCs. **Climate change** (10 minutes) Use question and answer to find out what students already know about climate change. Ask students to list the impact of climate change.	QnA between teachers and students Written responses to questions Class discussion	Doddle: The Greenhouse Effect Presentation and Worksheet What are the products of combustion animation	C3 Sp2 Sp9 C2

	Aiming for Grade 6 LOs: • Explain the possible effects of global climate change and why they are difficult to predict. • Explain possible methods to reduce greenhouse gas emissions. • Explain some of the problems in trying to reduce greenhouse gas emissions. **Aiming for Grade 8 LOs:** • Evaluate the scale, risk, and environmental impact of global climate change. • Justify why reducing greenhouse gas emissions can be difficult to achieve. • Evaluate the use of products, services, or events in terms of their carbon footprint.	What challenges do we face when reducing carbon footprints? Which consequences should concern us most?	**Mains** **Discussing climate change** (40 minutes) Students should look back at the conclusion they wrote in the previous lesson. They then add to this conclusion what the potential effects of global climate change are, what actions are being taken to try to reduce the effects of global climate change, and what are the problems faced. Students then make a list of all their daily routines that may contribute to their carbon footprint. Ask students to make a bullet-point list of three ways that they could reduce their carbon footprint and the steps they can take to achieve this. Students could use an online calculator to calculate their carbon footprint. **Plenaries** **Consequences list** (5 minutes) Students look at statements describing consequences of global warming. They sort them according to whether they are economic, environmental, or social. **Radio advert** (10 minutes) Ask students to write a brief radio advert (no more than one minute) about the possibility of climate change, its impact, and how you could change your lifestyle to reduce the effect.	Persuasive argument to limit the burning of fossil fuels linking causes to consequences	Microsoft teams assignments	
C13.5 Atmospheric pollutants	**Aiming for Grade 4 LOs:** • List some atmospheric pollutants. • Describe how carbon monoxide and soot (carbon) can be made from the incomplete combustion of fossil fuels. • Complete word equations to describe how atmospheric pollutants can be made.	Are congestion charges fair? How might levels of respiratory illness change between city	**Starters** **Burning sulfur** (5 minutes) Demonstrate the combustion of sulfur. Ask students to suggest what the solution formed at the bottom of the gas jar indicates about the product of the reaction and then use this evidence to predict the effect on the atmosphere. **Equations** (10 minutes) Ask students to write the combustion equation for nitrogen forming nitrogen monoxide, nitrogen forming nitrogen dioxide, a hydrocarbon forming carbon dioxide and water, a	QnA between teachers and students Written responses to questions Class discussion	Doddle: Atmospheric Pollutants Presentation, Worksheet and Mini Quiz Microsoft teams assignments	So3 C3 Sp2 Sp9 C2 Sp1

	Aiming for Grade 6 LOs: • Explain how sulfur dioxide and nitrogen oxides are made when fossil fuels are combusted. • Describe the health impacts of atmospheric pollutants. • Use balanced symbol equations to show how atmospheric pollutants are formed. **Aiming for Grade 8 LOs:** • Predict the products of combustion of a fuel given appropriate information about the composition of the fuel and the conditions in which it is used. • Evaluate the negative social, economic, and environmental consequences of atmospheric pollution. • Suggest and explain methods to reduce atmospheric pollution.	and country side? Is China / UK doing enough to tackle air pollution? Should the government pay of a carbon monoxide detector in every home?	hydrocarbon forming carbon, carbon monoxide, and water, and finally sulfur forming sulfur dioxide. **Mains** **Using fuels** (40 minutes) Introduce students to what a fossil fuel is, how fossil fuels are made, and the environmental consequences of using them. Students then complete the practical as detailed. Ask students what they notice as they use the flames. Students should focus on each flame separately, writing an equation to illustrate the reaction, and then annotate the products to explain their environmental impact as atmospheric pollutants. Then explain that fossil fuels often contain sulfur impurities, which are now removed from petrol. Ask students to write a combustion equation for this reaction when sulfur impurities are not removed, and again to annotate the equation to explain the effects of the product as an atmospheric pollutant. Ask students to generate a visual summary of fossil fuels, encouraging them to use equations in their work.			

Year 9 Summer Term 2 Timetable and Scheme of Work.

Y9 Half term 1	Topic Studied
1	B17 Organising and ecosystem
2	AP2

· At the end of year 11, students will be sitting the Combined Science Trilogy GCSE from AQA. The specification can be found here: https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464

· During this summer term, students will be learning about the topics outlined above.

· The scheme of work below is what students would follow if they were in school and is based on the Oxford University Press 5 year curriculum.

· We will aim to set tasks following this lesson by lesson structure however many of the activities will be different for home learning however they may give you some ideas on how to take your learning further.

· You may find the objectives most useful as this highlights what the pupils need to understand /know for each grade

GCSE Biology B17 Organising an Ecosystem			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
How materials are recycled within ecosystems.	**Knowledge** • Key terms to represent organisms in different places in the food chain • List to factors that affect the rate of decay • Name some processes through which carbon and water are recycled **Understanding** • Explain the carbon and water cycle in detail • Predict the locations and conditions in which decay would occur most quickly and apply knowledge to everyday use • Predict the consequences of changes to populations of organisms within a food chain **Skills** • Describe and explain in detail using scientific terminology • Make predictions based on knowledge and understanding	Link to previous topics to determine the impact that biotic and abiotic factors have on the recycling of materials Independent research into a specific food chain and the impact of the decline in the population of one species Apply knowledge to real world situations to explain why findings in the arctic are particularly valuable to science.	BBC Bitesize Doddle – power points and quick quizzes You tube: 'Free science lessons' Seneca learning platform Organising an ecosystem Microsoft Teams Assignment

Scheme of Work 2020-2021

Subject: GCSE Science: B17 Organising and Ecosystem

Year Group: 9

Specification: AQA Combined Science Trilogy

Skill focus: 20, 3

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
7.1 Feeding Relationships	**Aiming for Grade 4 LOs:** • State the meaning of the terms producer, consumer, predator, and prey, and give examples of each. • Identify producers, consumers, predators, and prey in a food chain. • Describe what a graph shows about how the numbers of predators and prey change over time.	What would be the impact of introducing brown bears into England?	**Lesson Overview** **Starters** **Producers** (5 min) Show the class images of different plants and algae. Ask students to write down why they think they are called producers. After hearing their ideas, discuss the fact that plants and algae are able to produce their own food by photosynthesis. **Food chains** (10 min) Ask students to work in groups and give each group an example of a food chain on a large sheet of paper. Ask them to annotate it with as much	QnA between teachers and students Written responses to questions Class discussion	Learn the Keywords for the topic: Prey Predator Producer Consumer Secondary Tertiary	So3 C3 Sp2 Sp9 Sp5 C2

	Aiming for Grade 6 LOs: • Identify producers, primary consumers, secondary consumers, tertiary consumers, predators, and prey in a food web. • Describe what happens to a population in a food web when another population changes. • Plot data as a line graph and explain the pattern of predator and Prey populations. **Aiming for Grade 8 LOs:** • Explain in detail why all living things depend on producers. • Evaluate in detail food chains/webs as models to show feeding relationships. • Make predictions based on data on a predator–prey relationship.		scientific terminology as they can (e.g., label the plant as a producer). **Mains** **Food webs** (15 min) Provide students with an example of a food web. Set them a series of questions on categorising the different organisms and on how a change in the population of one organism can affect another. **Predator/prey relationship** (25 min) Give students data showing changes in the population of a prey and predator. Ask them to plot the data on a suitable graph (both populations should be on the same set of axes). Then ask students to explain the shape of the graph. They can use the explanation of the predator–prey cycle in the corresponding student book to assess their answer. **Plenaries** **Feeding relationship key words** (10 min) Students complete the interactive to revise key words and their definitions. **Predator and prey** (5 min) Ask students to suggest what would happen to a predator/prey graph when the following variables are changed: • prey birthrate • predator effectiveness. Students should justify their answers.	Free written piece where students should write as much as they can about a given food chain (H) Free written piece about the consequences of extinction on one member of the food chain	Food chain Food web Decomposer Ecosystem Habitat Decay Detritivores Carbon Recycled Photosynthesis Combustion Respiration Doddle: Feeding relationships presentation, worksheet and Mini Quiz	
B17.2 Materials and Cycling	**Aiming for Grade 4 LOs:** • Describe what a decomposer is and give examples. • Name some substances that are recycled in the living world. • Describe the events in the water cycle.	Do atoms really ever go away?	**Lesson Overview** **Starters** **A world without decay** (10 min) Ask students to form groups and discuss what the world would be like if there was no decay. Ask groups to feed back their ideas and draw out the idea that decay is useful for recycling materials. **The water cycle** (5 min) Students use their prior knowledge to label a	B10: Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change. (triple only) (spec.: 4.7.2.3, collins: 8.13)	Doddle: Cycling materials presentation	So3 C3 Sp2 Sp9 C8 Sp1

	Aiming for Grade 6 LOs: • Explain why decomposers are important to a stable ecosystem. • Explain the importance of recycling substances. • Describe the events in the decay cycle. **Aiming for Grade 8 LOs:** • Explain how detritivores increase the rate of decay using ideas about surface area. • Explain how substances change as they decay. • Comment on the limitations of a simple model of decay.		diagram of the water cycle on the interactive. **Main** **The decay cycle** (20 min) Provide students with cards that describe the parts of the decay cycle (Figure 2 in the student book. Ask students to arrange the cards to create a cycle that shows how carbon atoms and mineral ions are recycled. They can check their answers against the diagram in the student book. **Explaining decay** (20 min) Ask students to work in pairs to write a suitable narration that explains what is happening in Figure 1 of the student book. Their narration should include which organisms are carrying out the process of decay and why decay is vital for the survival of other organisms in the ecosystem. They should use the information in the student book to help them. **Plenaries** **Modelling decay** (10 min) Provide students with simple models made out of interlocking plastic blocks. Ask them to rearrange the blocks to build something else, and then explain how this models the decay cycle. **Importance of the water cycle** (5 min) Go round the class and ask each student to state one thing that would happen if there was no water cycle. Discuss how important it is to life on Earth.			
B17.3 The Carbon Cycle	**Aiming for Grade 4 LOs:** • Recognise that carbon atoms are moved around the Earth (recycled). • Give one reason why we need to recycle carbon. • Use a diagram of the carbon cycle to describe the main processes involved.	Where could the carbon that is in your body been before?	**Lesson Overview** **Starters** **Study the cycle** (10 min) Split the class into groups of four to five students, and give each group a piece of A4 paper. One student from each groups comes to the front and has 30 seconds to study an image of the carbon cycle. They then return to their group and describe what they saw, with the rest of the group drawing it. The next student from each group comes up and gets 30 seconds to study the image, before returning to the group and adding to their image. This continues until each member of the group has studied the image and reported back. Invite each group to share their diagram for the rest of the class	QnA between teachers and students Written responses to questions Class discussion 6 mark exam questions on the carbon cycle	Doddle: The carbon cycle animation	So3 C3 Sp2 Sp9 Sp1

	Aiming for Grade 6 LOs: • Describe the events in the carbon cycle. • Explain why the carbon cycle is vital to life on Earth. • Write word equations for photosynthesis, respiration, and combustion. **Aiming for Grade 8 LOs:** • Explain in detail why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue. • Explain the links between photosynthesis, respiration, and combustion in the carbon cycle. • Write balanced symbol equations for photosynthesis, respiration, and combustion.		to judge which group re-created the carbon cycle the most accurately. **Fossil fuel combustion** (5 min) Light a Bunsen burner and ask students to suggest how this links to photosynthesis. You may wish to give hints, for example, what is burning? (methane/natural gas), what gas is produced from the burning of methane? (carbon dioxide). **Main** **Processes in the carbon cycle** (30 min) Split the class into groups and give each group a process of the carbon cycle to study in more detail (photosynthesis, respiration, combustion, decay and decomposition, feeding). Ask each group to research how their process moves carbon from one place to another, name the places, write down any word equations for the process, and draw a picture to represent it. Then ask them to present their findings and use them to compile a class diagram of the carbon cycle. Use an animation of the carbon cycle to check and reinforce students' understanding. **Pass the carbon** (10 min) Provide groups of five students with a soft ball to represent a carbon atom. Give students roles as parts of the carbon cycle (the atmosphere, plant, animal, fossil fuel, decomposer). Ask the group to pass the ball around to model how carbon is recycled, and to name each process that they are showing. **Plenaries** **Jurassic carbon** (10 min) Tell the class that a carbon atom in their body might have been part of a dinosaur millions of years ago. Ask students to discuss in pairs how this could be true. **Carbon cycle sort** (5 min) Students are shown the main parts of the carbon cycle and have to arrange them in the correct order.			