

Year 10 2020-2021

Half Term 6 (Summer 2)

GCSE Biology B7 Non Communicable Disease

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>To be able to identify what a non-communicable disease is. Understand how cancer is formed and spread, and be able to identify risk factors that increases chances of developing a non-communicable disease.</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Identify what diseases are non- communicable • Identify correlations and casual links between factors and disease • Define the term tumour • State causes of cancer • Identify the harmful substances in tobacco smoke • Define the health problems caused by lack of exercise and poor diet • Define the term carcinogen • State how alcohol can affect unborn babies <p>Understanding</p> <ul style="list-style-type: none"> • Explain risk factors that link to non-communicable diseases • Describe how a tumour is formed and Describe the difference between benign and malignant tumour • Evaluate the risks of chemotherapy • Analyse data to evaluate the links between smoking and lung cancer • Suggest measures to prevent the rise in type 2 diabetes • Explain the links between poor diet and poor health • Analyse data from lack of exercise, poor diet, smoking and alcohol intake and evaluate the casual mechanism/links • Describe the link between ionising radiation and cancer. • Explain the short term and long term effects of alcohol <p>Skills</p> <ul style="list-style-type: none"> • Read values from a graph • Appropriate line of best fit is drawn • Pattern described with reference to both variables • Identify simple trends and patterns within data • Giving examples from the data to support patterns and trends seen • Evaluate whether the data is sufficient to decide if the hypothesis is supported. (considering validity) • Name: Only a short answer is required, not an explanation or a description. Often it can be answered with a single word, phrase or sentence. 	<p>Able to analyse explicate data and come to conclusions regarding casual mechanisms and links between factors and the development of the disease</p> <p>Research into the highest non communicable diseases in our country and identify links to these based on lifestyle choices</p> <p>Create an advertising campaign for highlighting the importance of exercise and healthy diet</p> <p>Research foetal alcohol syndrome and links to knowledge studying regarding the carcinogens within alcohol</p> <p>Explain why cancer treatments are ongoing and scientists continue to research and study cancers</p> <p>Plan a study that could be conducted to research the impact of particular risk factors</p>	<p>BBC Bitesize</p> <p>Doddle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p> <p>NHS website</p> <p>Macmillan Cancer website</p>

Scheme of Work 2020-2021

Subject: GCSE Science: B7: Non-Communicable Disease

Year Group: 10 /11

Specification: AQA Combined Science Trilogy

Skill focus: 13e, f and g, 14, 19c

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
B7.1 Non-Communicable Disease	Aiming for Grade 4 LOs: <ul style="list-style-type: none"> Name some non-communicable diseases. List some risk factors that are linked to an increased rate of a disease. Identify correlations in data. 	What are the biggest killers in the UK? Does disease only affect individuals?	Lesson Overview Starters Top killer diseases (10 min) Tell students that in 2012 some examples of the top 10 diseases that caused death were lung cancer, HIV/AIDS, stroke, heart disease, diabetes, and lung infections. Ask them to order the examples with the biggest killer first, before revealing the answers. Communicable or non-communicable? (5 min) Read out a list of diseases and ask the class to state whether they are communicable or non-communicable.	Class discussion between students and teachers Brainstorm on non-communicable diseases Use of secondary data to identify risk factors Written work Checking students' written responses	Learn the Keywords for the topic: Non-communicable disease tumour chemotherapy ionising radiation carcinogen Benign diabetes	SO3 SO9 SP1 SP2 SP5 SP9 C2
	Aiming for Grade 6 LOs: <ul style="list-style-type: none"> Classify diseases as communicable or non-communicable. Draw conclusions from data on risk factors. Decide whether a link is causal. 		Main How big is the risk? (40 min) Supply students with a range of risk factors that are lifestyle choices, for example, eating lots of sugary foods, smoking cigarettes, and not carrying out regular exercise. Ask students to place each risk factor on a continuum line showing effect on health, and to explain their choice. Then provide groups of students with a range of data showing links between risk			
	Aiming for Grade 8 LOs: <ul style="list-style-type: none"> Describe some impacts of non-communicable diseases. Identify risk factors from data. Explain why a correlation does not prove a causal mechanism. 					

			<p>factors and different diseases. Ask students to interpret the data and look for correlations and causal links.</p> <p>Plenaries</p> <p>Tips for healthy living (5 min) Ask students to write down their top five tips to minimise the risk of developing a non-communicable disease.</p> <p>Correlation and causation (10 min) Bump up your grade worksheet</p> <p>where students answer questions to define the terms correlation and causation, and explain how they are applied.</p>		Doddle: Health, life style and disease presentation	
B7.2 Cancer	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> Define a tumour as a mass of abnormally growing cells. State some causes of cancer. List some of the benefits and risks of chemotherapy. 	<p>What might happen if all cancers were cured overnight?</p>	<p>Lesson Overview</p> <p>Starters</p> <p>What do I already know? (5 min) Ask students to write down what they already know about cancer. Discuss whether there is anything they would like to find out. Sensitivity is needed during this activity and the rest of the lesson as students may have been affected by some of the issues covered.</p>	<p>Q & A between students and teachers</p>	<p>Doddle:</p> <p>Cancer presentation</p> <p>AQA cancer quiz</p>	<p>SO3</p> <p>SO9</p> <p>SP1</p> <p>SP2</p> <p>SP5</p> <p>SP9</p> <p>C2</p>
	<p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe the difference between benign and malignant tumours. Describe why carcinogens and ionising radiation increase the risk of tumours forming. Analyse data to assess the risks and benefits of chemotherapy. 	<p>Why do you think we haven't been able to cure cancer?</p>	<p>Cell cycle order (10 min) Provide students with the stages of the cell cycle from Topic B2.1. Students put the stages in the correct order. Discuss how cells may sometimes stop responding to the normal mechanisms that control the cell cycle and divide rapidly.</p>	<p>Mind map on benign and malignant tumour</p>		
	<p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Explain how benign and malignant tumours can be life-threatening. Link a lack of control in the cell cycle to tumour formation. Evaluate the risks of chemotherapy in relation to data, drug testing, 	<p>Is it ever right to refuse treatment to a patient?</p>	<p>Main</p> <p>Cancer (40 min) Introduce the term tumour as a mass of abnormally dividing cells. Explain the difference between benign and malignant tumours, and suggest how they cause health problems.</p> <p>Students then create a leaflet or a poster to educate the public about the causes of cancer (e.g., carcinogens, ionising radiation, some viruses), and some of the risks and benefits of cancer treatments (e.g., radiotherapy, chemotherapy). They can use information from books and the Internet.</p> <p>Plenaries</p>	<p>Written task on cancer</p> <p>Checking students' responses</p> <p>6 mark exam question</p>		

	and consequences in order to come to an informed decision.		<p>What have I learnt? (5 min) Ask students to write down three new things they have learnt in the lesson. Ask a few students for feedback and record this.</p> <p>Cancer risk factors (10 min) Read out some lifestyle choices, for example, smoking, a stressful job, a diet high in fat, having the HPV vaccination, using sunbeds. Ask students to raise two hands if they think a lifestyle choice greatly increases the risk of cancer, one hand if they think there is a link, and no hands if they think there is no link. Ask students to justify their choice.</p>			
B7.3 Smoking and the risk of disease	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> Name the harmful substances found in tobacco smoke. State that smoking increases your risk of developing lung diseases. 	Why do doctors still smoke?	<p>Lesson Overview</p> <p>Starters</p> <p>Standardised packaging (10 min) Show students an image of the plans for new standardised cigarette packaging in the UK from 2016. Ask them to vote on whether they think this is a good idea, and explain their reasoning.</p> <p>Smoking links (5 min) Show students a graph that indicates the link between smoking and lung cancer for them to interpret.</p> <p>Main</p> <p>The effects of smoking (40 min) Carry out the demonstration to show some of the products of smoking cigarettes. Ask students to write down what the experiment showed. Students then create a spider diagram to show the substances in cigarette smoke and their effect on health. Students then analyse data on smoking and risk factors, and describe how they provide evidence for causal links between smoking and various non-communicable diseases.</p> <p>Plenaries</p> <p>Tobacco smoke (10 min) Call out the name of substances in tobacco smoke. Students have to identify the associated health problems.</p> <p>Trends in smoking (5 min) Students use the interactive to analyse a graph and answer questions about how the number of people smoking in the UK has changed over the last 50 years.</p>	class discussion on smoking	Doddle: Risk factors presentation	SO3 SO9 SP1 SP2 SP5 SP9 C2
	<p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe the effects of the harmful substances found in tobacco smoke. Analyse data to describe evidence for the link between smoking and lung disease. 	Should the government ban smoking?				
	<p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Explain in detail the effects of the harmful substances found in tobacco smoke. Suggest possible causal mechanisms to explain trends shown in data, and explain how the causal link between smoking and lung cancer was identified. 	How has the attitude towards smoking changed over time?				

<p>B7.4 Diet, exercise and disease</p>	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> Describe some health problems caused by a poor diet and lack of exercise. List some ways in which people can avoid becoming overweight. <hr/> <p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe causal mechanisms for the link between exercise and health. Suggest measures to prevent a further rise in the number of people with type 2 diabetes. <hr/> <p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Suggest reasons for the correlation between exercise and health, and decide which are causal. Explain in detail why eating a poor diet can lead to health problems. 	<p>Do we take exercise seriously enough?</p> <p>Should we be charged for gyms?</p> <p>Should exercise be compulsory for some people?</p> <p>Is it enough just to diet/ or just to exercise?</p>	<p>Lesson Overview</p> <p>Starters</p> <p>Exercise and health (10 min) Tell the class that people who exercise are healthier (less likely to develop non-communicable diseases) than those who don't exercise. Ask students to list possible reasons why.</p> <p>Energy in, energy out (5 min) Show the students the trailer for the documentary film <i>Super Size Me</i>. Ask pairs to discuss why you could become obese if you eat too much.</p> <p>Main</p> <p>Preventing the diabetes epidemic (40 min) Provide groups of students with some sticky notes. Ask them to write down information from the student book about the effects on the body of eating too much unhealthy food and not taking enough exercise. Students should stick the notes down on the desk to create flow charts. These should contain several paths describing how eating unhealthily leads to the problems outlined in the student book, such as type 2 diabetes and heart disease. Then tell the class that the number of people their age being diagnosed with type 2 diabetes is rising. Students should explain why, using what they have learnt. Ask groups to work as a Government advisory group and come up with suggestions to stop this epidemic.</p> <p>Plenaries</p> <p>Health problems (10 min) Students use the interactive to choose which health problems are associated with a poor diet and lack of exercise.</p> <p>Obesity data (5 mins) Show students a piece of data that shows a correlation between a factor and obesity, for example, country of residence, age, sex, ethnicity, or income. They then describe the pattern.</p>	<p>Students to carry out different type of exercise in groups and measure the pulse rate</p>	<p>Doddle: Cardiovascular presentation</p>	<p>SO3 SO9 SP1 SP2 SP5 SP9 C2</p>
<p>B7.5 Alcohol and other</p>	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> State that drinking too much alcohol can affect liver and brain function. 	<p>Why are the most dangerous drugs still legal?</p>	<p>Lesson Overview</p> <p>Starters</p>		<p>Doddle:</p>	<p>SO3 SO9</p>

<p>carcinogens</p>	<ul style="list-style-type: none"> State that alcohol can affect unborn babies. Define the term carcinogen. <p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe the short- and long-term effects of drinking alcohol. Describe the effects of alcohol on unborn babies. Describe the link between ionising radiation and cancer. <p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Explain in detail how drinking alcohol affects the nervous system. Evaluate evidence on the effects of alcohol on a developing baby. Explain the link between ionising radiation and cancer. 	<p>Is binge drinking really as bad as alcoholism?</p> <p>Have we changed our attitude towards a sun tan?</p> <p>Do we need to take the same steps as Australia to beat skin cancer?</p>	<p>Which drug is the most harmful? (10 min) Provide students with a piece of paper or a mini-whiteboard. Ask them to write down which recreational drug they think is the most harmful and reveal their answers. Show them data that claims that alcohol is the most harmful. Discuss why this is by considering the effects of alcohol on the individual and society.</p> <p>Alcohol effects (5 min) Students list examples of how drinking alcohol affects the body.</p> <p>Main</p> <p>The effects of alcohol (30 min) Students look at the effects of alcohol on the body and on baby development. They analyse the given evidence and use it to come to their own conclusion on the risks of alcohol, and to support or refute the claim that pregnant women should not drink alcohol.</p> <p>Ionising radiation (10 min) Explain that ionising radiation is a carcinogen. Ask students for suggestions of sources of ionising radiation that they may come into contact with. After hearing their ideas, allow students to use the student book to list them.</p> <p>Discuss the fact that coming into contact with ionising radiation increases the risk of developing cancer. Ask students to list lifestyle choices that will increase this risk, for example, using tanning beds or having x-rays.</p> <p>Plenaries</p> <p>Effects of alcohol (10 min) Bump up your grade worksheet where students analyse data on the effects of alcohol and determine cause-and effect relationships.</p> <p>Alcohol statements (5 min) Use the interactive, which asks students to type in answers to complete sentences about the effects of alcohol on the body.</p>	<p>Class discussion between students and teachers</p> <p>Exam questions</p>		<p>SP1</p> <p>SP2</p> <p>SP5</p> <p>SP9</p> <p>C2</p>
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GCSE Physics P13 Electromagnetic Waves

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
<p>The uses of waves in the electromagnetic spectrum</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • List electromagnetic waves and give some basic uses of each wave • List some of the dangers of waves in the electromagnetic spectrum <p>Understanding</p> <ul style="list-style-type: none"> • Understand how electromagnetic waves differ in only their wavelength and frequency • Link the structure (wavelength and frequency) of the wave to its function • Evaluate the use of electromagnetic waves <p>Skills</p> <ul style="list-style-type: none"> • Link structure and function • Express numbers in standard form • Rearrange and use scientific calculations 	<p>Confident use of standard form including multiplication if necessary</p> <p>Critical evaluation of use of electromagnetic waves in technology such as 5G and the impact on human health</p> <p>Use a greater variety of standard units including Sv and mSv</p> <p>Independent research on photons and how they link to this topic</p> <p>Links to previous topics studied including speed, alternating currents, radioactivity and infrared radiation</p>	<p>BBC Bitesize</p> <p>Doodle – power points and quick quizzes</p> <p>You tube: ‘Free science lessons’</p> <p>Seneca learning platform</p>

Scheme of Work 2020-2021

Subject: GCSE Science: P13: Electromagnetic Waves

Year Group: 10 /11

Specification: AQA Combined Science Trilogy

Skill focus: 19, 25, 24

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
P13.1 The Electromagnetic Spectrum	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> State that electromagnetic (EM) waves transfer energy without transferring matter. Identify the position of EM waves in the spectrum in order of wavelength and frequency. State that all EM waves travel at the same speed in a vacuum. 	<p>What is the electromagnetic spectrum?</p>	<p>Lesson Overview</p> <p>Starters</p> <p>The visible spectrum (10 min) Ask students to outline their prior knowledge of the electromagnetic spectrum by asking them to show how light is reflected, transmitted, or refracted.</p> <p>Light speed (5 min) Ask the students to use the following data to determine the speed of light. It takes 1.3 s to travel from the Earth to the Moon, a distance of 390 000 km [300 000 km/s or 300 000 000 m/s].</p> <p>Main</p> <p>Introducing electromagnetic waves (25 min) Recap the nature of electromagnetic radiation compared with mechanical waves. Focus on the wide range of wavelengths of the waves, linking this to the effects. Show the link between frequency and wavelength. Students need to attempt a few calculations of wavelength and frequency.</p>	<p>Q & A, Use of mini white boards, exam style question.</p>	<p>Doddle Electromagnetism Presentation,</p> <p>Doddle AQA Electromagnetism Mini Quiz, AQA</p> <p>Doddle Types of electromagnetic waves Mini Quiz,</p>	<p>C1, Sp3,C3</p>
	<p>Aiming for Grade 6 LOs:</p> <p>Describe the relationship between the energy being transferred by an electromagnetic</p> <ul style="list-style-type: none"> wave and the frequency of the wave. Calculate the frequency and the wavelength of an electromagnetic wave. Explain why the range of wavelengths detected by the human eye is limited. 					

	<p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Apply the wave model of electromagnetic radiation as a pair of electric and magnetic disturbances that do not require a medium for travel. Use standard form in calculations of wavelength, frequency, and wave speed. <p>Explain the interactions between an electromagnetic wave and matter.</p>		<p>Outline the link between frequency and energy. Students then carry out the practical. They can either rotate through all of the experiments, or each group carries out one experiment and then they share and discuss results.</p> <p>EM waves and matter (15 min) Recap absorption, reflection, and transmission using visible light as an example and ask students if this behaviour will be the same for all electromagnetic waves and materials.</p> <p>Plenaries</p> <p>RMIVUXG? (5 min) The students may know a mnemonic to give the order of the visible spectrum. Can they think up a method of remembering the regions of the electromagnetic spectrum?</p> <p>EM calculations (10 min) Students complete the interactive where they are given further calculations of wavelength or frequency for electromagnetic waves.</p>			
<p>P13.2 Light, infrared, microwaves and radio waves</p>	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> Describe how white light is a part of the electromagnetic spectrum and is composed of a range of frequencies. List some simple examples of the uses of light, microwaves, and radio waves. Measure the rate of cooling due to emission of infrared radiation. 	<p>How dangerous are our mobile phones?</p>	<p>Lesson Overview</p> <p>Starters</p> <p>Radio gaga (5 min) Give the students a set of mixed-up sentences about radio waves and ask them to sort the words into the right order to produce correct sentences.</p> <p>Colour filters (10 min) Shine a bright white light through a series of filters and ask the students to explain what is happening with a diagram. Ask the students if they think that there will be a similar effect for the non-visible parts of the spectrum. This leads into the absorption of electromagnetic energy as it passes through materials.</p> <p>Main</p> <p>Absorption and emission of infrared radiation (20 min) Students investigate the absorption and emission of infrared radiation using the required practical task.</p> <p>Electromagnetic radiation (20 min) Remind students of the different parts of the electromagnetic spectrum. Then introduce the uses of IR radiation, microwaves, and radio waves.</p>	<p>P10: Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface. Colins 6.15 6.12</p>	<p>BBC Bitesize</p> <p>You tube: 'Free science lessons'</p> <p>Seneca learning</p>	<p>Sp7,Sp2</p>
	<p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe how a range of electromagnetic waves are used in a variety of scenarios. Explain why a particular wave is suited to its application. Plan an investigation into the rate of cooling of infrared radiation. 					
	<p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Determine the wavelength of radio waves in air. 					

	<ul style="list-style-type: none"> Describe the interactions between a range of waves and matter, including the effect of absorption. Evaluate an investigation into the rate of cooling of infrared radiation 		<ul style="list-style-type: none"> IR radiation – emphasise the relatively low energy of the waves but explain that high intensity (relate to ‘brightness’) can mean that large amounts of energy can be delivered by electric heaters and so on. Microwaves – describe the uses of microwaves, ideally with a phone and a microwave oven as props. Students should note that microwaves are absorbed by water and fat molecules, and this absorption produces the heating effect. Radio waves – Demonstrate a radio to show that radio waves can penetrate walls. Bluetooth devices such as console game controllers can also be shown. Moving the device gradually further away from its partner will allow the students to check the maximum range. <p>They should use the student book (and other resources if available) to produce a revision summary of the uses of the different parts of the electromagnetic spectrum.</p> <p>Plenaries</p> <p>EM wave summary (10 min) Students produce a summary about all of the areas of the electromagnetic spectrum they have studied so far.</p> <p>What’s the frequency? (5 min) Students use the interactive to calculate the wavelengths of some radio stations when given the frequency. They should then calculate the radio station frequency when given the wavelength. This recaps the calculations from earlier.</p>			
<p>P13.3 Communications</p>	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> State that radio waves and microwaves are used in communications through the atmosphere. State that the higher the frequency of a wave, the greater the rate of data transfer possible. Describe the sub-regions of the radio spectrum. <p>Aiming for Grade 6 LOs:</p>	<p>How have optical fibres improved our lives?</p>	<p>Lesson Overview</p> <p>Starter</p> <p>Instant messaging (5 min) How does mobile phone messaging work? Students complete the interactive to explain how a message gets from one phone to another phone in the same room by putting the different stages in order.</p> <p>Get the message across (10 min) The students must think up as many ways as possible to communicate with each other and pass on a simple message such as ‘I am hungry’ or ‘I am thirsty’.</p>	<p>Q & A, Use of mini white boards, exam style question.</p>	<p>Doddle AQA Uses of electromagnetic waves Mini Quiz</p>	<p>C1, Sp3,C3</p>

	<ul style="list-style-type: none"> • Compare the rate of information transfer through optical fibres and radio signals. • Outline the operation of a mobile phone network and the waves used. • Discuss the evidence for mobile phone signals causing damage to humans. 		<p>Main</p> <p>Radio waves and mobile phones (20 min) Discuss the various regions of the radio spectrum, with a particular emphasis on the position of microwaves within it. Link this to the rate at which data can be transmitted – microwaves provide the greatest rate. Discuss the transmission of signals, particularly the need for transmission towers – the phones do not communicate directly. An older, broken phone may be useful here to show the aerial. No link between mobile phone use and brain effects has so far been found – the intensity of the signals are very low and are unlikely to cause damage. Students then complete the Bump up your grade worksheet to consolidate their understanding of the electromagnetic spectrum and how microwaves and radio waves are used in communication.</p> <p>Optical fibres for communication (20 min) Demonstrate a simple transition of light pulsed through a fibre with a torch and convoluted path for the cable. Remind students that visible light and IR are much higher frequency than radio and so fibres will transmit data at a higher rate. Students can compare energy and information transfer through a fibre to that in radio transmissions.</p> <p>Higher-tier students also need to discuss signals and carrier waves. The process here is quite complex and students need to be led through the stages carefully.</p> <p>Plenaries</p> <p>Round the bend (5 min) Give the students a diagram of an optical fibre with a curved path and ask them to draw the path of a ray that is shown entering the fibre.</p> <p>Broken signal (10 min) Students design a leaflet from a satellite TV company explaining why the television signal has been poor recently. It should explain how the TV signal is transmitted to the house and what factors can affect it (rain, snow, sunspots).</p>			
<p>P13.4 Ultraviolet waves,</p>	<p>Aiming for Grade 4 LOs:</p> <ul style="list-style-type: none"> • State that high-frequency electromagnetic radiation is ionising. 	<p>Why are these types of</p>	<p>Lesson Overview</p> <p>Starters</p>	<p>Q & A, Use of mini white boards, exam</p>	<p>BBC Bitesize</p>	<p>C1, Sp3,C3</p>

<p>Xrays an Gamma Rays</p>	<ul style="list-style-type: none"> Describe the uses and dangers of ultraviolet (UV) radiation. Describe the uses and dangers of X-rays and gamma radiation. <p>Aiming for Grade 6 LOs:</p> <ul style="list-style-type: none"> Describe the penetrating powers of gamma rays, X-rays, and ultraviolet rays. Compare X-rays and gamma radiation in terms of their origin. Describe the ionisation of atoms in simple terms. <p>Aiming for Grade 8 LOs:</p> <ul style="list-style-type: none"> Describe in detail the interaction between ionising radiation and inorganic materials. Compare different regions of the electromagnetic spectrum in terms of their potential harmfulness. Explain how the process of ionisation can lead to cell death or cancer through damage to DNA. 	<p>radiation so dangerous?</p>	<p>Mutant mayhem (5 min) ‘Mutants’ with super powers caused by exposure to radiation are common in films and comics. Do students think that this radiation can have beneficial effects in reality?</p> <p>Stellar imagery (10 min) Show a range of images of the Sun, capturing the different parts of the EM spectrum (a visible light image, ultraviolet, infrared, and so on). Discuss how these images are captured and which parts reach the surface of the Earth.</p> <p>Main</p> <p>UV, X-rays, and gamma rays (40 min) Start by demonstrating the effect of UV radiation on a range of materials to show that it exists using the practical outlined. Emphasise the damage it can cause, particularly to the eyes. Images of skin damage are readily available on the Internet.</p> <p>Move to higher-frequency/higher-energy waves, emphasising the penetrating power through different materials. A few simple non-medical X-ray photographs can be used to outline a use for X-rays, because medical photographs will be used in Topic P12.5. Outline the key uses of gamma radiation, all of which are linked to high energy causing ionisation and damage to living cells. Describe the process of ionisation and, in particular, the damage to DNA. The students should understand that the greater the exposure, the more damage is likely. Various control procedures should be discussed, including reducing exposure, protective clothing, and dose measurement. The students should be provided with some data about the risks associated with radiation exposure to analyse.</p> <p>Plenaries</p> <p>One world (5 min) Interactive where students complete a paragraph to briefly discuss the problem with the ozone layer discovered in the 1980s and the steps taken to reduce it, to show that global problems can be solved when countries work together.</p> <p>Safety first (10 min) Students design a safety notice for either a sunbed or an X-ray machine.</p>	<p>style question, wave taboo.</p> <p>End of module test</p>	<p>You tube: ‘Free science lessons’</p> <p>Seneca learning</p>	
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