

**EMMANUEL COLLEGE**  
**THE SCIENCE DEPARTMENT**  
Year 9 GCSE Biology Curriculum



GCSE Biology		
Non-communicable diseases		
Construct:		
Source of knowledge	<p style="text-align: center;"><b>AQA Biology Third Edition Pages: 112-123</b>  <a href="T:\Science\Curriculum\KS4\BIOLOGY\AQA GCSE 1-9 2019">T:\Science\Curriculum\KS4\BIOLOGY\AQA GCSE 1-9 2019</a></p>	
<b>Knowledge</b>	<p><i>4.2.2.4 Coronary heart disease: a non-communicable disease</i></p> <p>In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them. This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle.</p> <p>Stents are used to keep the coronary arteries open.</p> <p>Statins are widely used to reduce blood cholesterol levels which slows down the rate of fatty material deposit.</p> <p>In some people heart valves may become faulty, preventing the valve from opening fully, or the heart valve might develop a leak.</p> <p>Students should understand the consequences of faulty valves.</p> <p>Faulty heart valves can be replaced using biological or mechanical valves.</p> <p>In the case of heart failure a donor heart, or heart and lungs can be transplanted.</p> <p>Artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery.</p> <p><i>4.2.2.5 Health issues</i></p> <p>Students should be able to describe the relationship between health and disease and the interactions between different types of disease.</p> <p>Health is the state of physical and mental well-being.</p>	<p>Students will apply the knowledge by;</p> <p>WS 1.4</p> <p>WS 1.3</p> <p>Evaluating methods of treatment (drugs, mechanical devices or transplant) bearing in mind the benefits and risks associated with the treatment.</p>

	<p>Diseases, both communicable and non-communicable, are major causes of ill health. Other factors including diet, stress and life situations may have a profound effect on both physical and mental health.</p> <p>Different types of disease may interact.</p> <ul style="list-style-type: none"> <li>• Defects in the immune system mean that an individual is more likely to suffer from infectious diseases.</li> <li>• Viruses living in cells can be the trigger for cancers.</li> <li>• Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma.</li> </ul> <p>Severe physical ill health can lead to depression and other mental illness.</p> <p>Students should be able to translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variables.</p> <p>Students should understand the principles of sampling as applied to scientific data, including epidemiological data.</p> <p><i>4.2.2.6 The effect of lifestyle on some non-communicable diseases</i></p> <p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• discuss the human and financial cost of these non-communicable diseases to an individual, a local community, a nation or globally</li> </ul> <p>explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels.</p> <p>Risk factors are linked to an increased rate of a disease.</p> <p>They can be:</p> <ul style="list-style-type: none"> <li>• aspects of a person's lifestyle</li> <li>• substances in the person's body or environment.</li> </ul> <p>A causal mechanism has been proven for some risk factors, but not in others.</p> <ul style="list-style-type: none"> <li>• The effects of diet, smoking and exercise on cardiovascular disease.</li> <li>• Obesity as a risk factor for Type 2 diabetes.</li> <li>• The effect of alcohol on the liver and brain function.</li> <li>• The effect of smoking on lung disease and lung cancer.</li> <li>• The effects of smoking and alcohol on unborn babies.</li> <li>• Carcinogens, including ionising radiation, as risk factors in cancer.</li> </ul> <p>Many diseases are caused by the interaction of a number of factors.</p>	<p>Maths skills 2c, 2g, 4a</p> <p>Maths skill 2d</p> <p>WS 1.4</p> <p>WS 1.5</p> <p>Interpret data about risk factors for specified diseases.</p>
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	<p>Students should be able to understand the principles of sampling as applied to scientific data in terms of risk factors.</p> <p>Students should be able to translate information between graphical and numerical forms; and extract and interpret information from charts, graphs and tables in terms of risk factors.</p> <p>Students should be able to use a scatter diagram to identify a correlation between two variables in terms of risk factors.</p> <p><i>4.2.2.7 Cancer</i></p> <p>Students should be able to describe cancer as the result of changes in cells that lead to uncontrolled growth and division.</p> <p>Benign tumours are growths of abnormal cells which are contained in one area, usually within a membrane. They do not invade other parts of the body.</p> <p>Malignant tumour cells are cancers. They invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours.</p> <p>Scientists have identified lifestyle risk factors for various types of cancer.</p> <p>There are also genetic risk factors for some cancers.</p>	<p>Maths skills 2d</p> <p>Maths skills 2c, 4a</p> <p>Maths skills 2g</p>
Vocabulary	<p><b>statins</b> drugs used to lower blood cholesterol levels and improve the balance of high- to low-density lipoproteins in the blood</p> <p><b>stent</b> a metal mesh placed in a blocked or partially blocked artery. They are used to open up the blood vessel by the inflation of a tiny balloon</p> <p><b>mutation</b> a change in the genetic material of an organism</p> <p><b>non-communicable diseases</b> are not infectious and cannot be passed from one organism to another</p> <p><b>virus</b> pathogens that are much smaller than bacteria and can only reproduce inside living cells of other organisms</p> <p><b>type 2 diabetes</b> a disorder where the body cells no longer respond to the insulin produced by the pancreas</p> <p><b>benign tumours</b> growths of abnormal cells that are contained in one area, usually within a membrane, and do not invade other tissues</p> <p><b>cancer</b></p>	

	<p>the common name for a malignant tumour, formed as a result of changes in cells that lead to uncontrolled growth and division</p> <p><b>carcinogens</b> agents that cause cancer or significantly increase the risk of developing cancer</p> <p><b>causal mechanism</b> something that explains how one factor influences another</p> <p><b>correlation</b> an apparent link or relationship between two factors</p> <p><b>ionising radiation</b> has enough energy to cause ionisation in the materials it passes through, which in turn can make them biologically active and may result in mutation and cancer</p> <p><b>malignant tumours</b> invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours. They are also known as cancers</p> <p><b>tumour</b> a mass of abnormally growing cells that forms when the cells do not respond to the normal mechanisms that control growth and when control of the cell cycle is lost</p>
<b>Assessment</b>	

<b>Year 9</b>		
Spring Term		
<b>B5 Communicable Diseases</b>		
<b>Construct:</b>		
Communicable diseases are caused by pathogens – microorganisms that can be spread from one organism to another. The body has developed a range of mechanisms to defend itself from pathogens. Lifestyle can contribute to our risk of developing communicable diseases.		
<b>Source of knowledge</b>	<b>T:\Science\Curriculum\KS4\BIOLOGY\AQA GCSE 2015\Y9 Biology\4.3 Infection and response</b> Kerboodle GCSE Biology Pg's 74-97	
<b>Knowledge</b>	<p>GCSE Combined Science + GCSE Biology</p> <p>Pathogens are microorganisms that cause infectious disease. Pathogens may be viruses, bacteria, protists or fungi. They may infect plants or animals and can be spread by direct contact, by water or by air.</p> <p>Bacteria and viruses may reproduce rapidly inside the body.</p> <p>Bacteria may produce poisons (toxins) that damage tissues and make us feel ill.</p> <p>Viruses live and reproduce inside cells, causing cell damage.</p>	<p>Students will <b>apply</b> the knowledge by;</p> <p>Students should be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants.</p> <p>Students should be able to explain how the spread of diseases can be reduced or prevented.</p> <p>Students should be able to describe the non-specific defence systems of the human body against pathogens, including the:</p> <ul style="list-style-type: none"> <li>• skin</li> </ul>

Measles is a viral disease showing symptoms of fever and a red skin rash. Measles is a serious illness that can be fatal if complications arise.

For this reason most young children are vaccinated against measles. The measles virus is spread by inhalation of droplets from sneezes and coughs.

HIV initially causes a flu-like illness. Unless successfully controlled with antiretroviral drugs the virus attacks the body's immune cells. Late stage HIV infection, or AIDS, occurs when the body's immune system becomes so badly damaged it can no longer deal with other infections or cancers. HIV is spread by sexual contact or exchange of body fluids such as blood which occurs when drug users share needles.

Tobacco mosaic virus (TMV) is a widespread plant pathogen affecting many species of plants including tomatoes. It gives a distinctive 'mosaic' pattern of discolouration on the leaves which affects the growth of the plant due to lack of photosynthesis.

Salmonella food poisoning is spread by bacteria ingested in food, or on food prepared in unhygienic conditions. In the UK, poultry are vaccinated against Salmonella to control the spread. Fever, abdominal cramps, vomiting and diarrhoea are caused by the bacteria and the toxins they secrete.

Gonorrhoea is a sexually transmitted disease (STD) with symptoms of a thick yellow or green discharge from the vagina or penis and pain on urinating. It is caused by a bacterium and was easily treated with the antibiotic penicillin until many resistant strains appeared.

Gonorrhoea is spread by sexual contact. The spread can be controlled by treatment with antibiotics or the use of a barrier method of contraception such as a condom.

Rose black spot is a fungal disease where purple or black spots develop on leaves, which often turn yellow and drop early. It affects the growth of the plant as photosynthesis is reduced. It is spread in the environment by water or wind. Rose black spot can be treated by using fungicides and/or removing and destroying the affected leaves.

The pathogens that cause malaria are protists.

The malarial protist has a life cycle that includes the mosquito. Malaria causes recurrent episodes of fever and can be fatal. The spread of malaria is controlled by preventing the vectors, mosquitos, from breeding and by using mosquito nets to avoid being bitten.

If a pathogen enters the body the immune system tries to destroy the pathogen.

- nose
- trachea and bronchi
- stomach.

Students should be able to explain the role of the immune system in the defence against disease.

Students should be able to explain how vaccination will prevent illness in an individual, and how the spread of pathogens can be reduced by immunising a large proportion of the population.

Students do not need to know details of vaccination schedules and side effects associated with specific vaccines.

Students should be able to explain the use of antibiotics and other medicines in treating disease.

Students should be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing.

### GCSE Biology Only

Students should be able to describe how monoclonal antibodies are produced.

Students should be able to describe some of the ways in which monoclonal antibodies can be used. Some examples include:

- for diagnosis such as in pregnancy tests
- in laboratories to measure the levels of hormones and other chemicals in blood, or to detect pathogens
- in research to locate or identify specific molecules in a cell or tissue by binding to them with a fluorescent dye
- to treat some diseases: for cancer the monoclonal antibody can be bound to a radioactive substance, a toxic drug or a chemical which stops cells growing and dividing. It delivers the substance to the cancer cells without harming other cells in the body.

White blood cells help to defend against pathogens by:

- phagocytosis
- antibody production
- antitoxin production

Vaccination involves introducing small quantities of dead or inactive forms of a pathogen into the body to stimulate the white blood cells to produce antibodies. If the same pathogen re-enters the body the white blood cells respond quickly to produce the correct antibodies, preventing infection.

Antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing infective bacteria inside the body. It is important that specific bacteria should be treated by specific antibiotics.

The use of antibiotics has greatly reduced deaths from infectious bacterial diseases. However, the emergence of strains resistant to antibiotics is of great concern.

Antibiotics cannot kill viral pathogens.

Painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens.

It is difficult to develop drugs that kill viruses without also damaging the body's tissues.

Traditionally drugs were extracted from plants and microorganisms.

- The heart drug digitalis originates from foxgloves.
- The painkiller aspirin originates from willow.
- Penicillin was discovered by Alexander Fleming from the Penicillium mould.

Most new drugs are synthesised by chemists in the pharmaceutical industry. However, the starting point may still be a chemical extracted from a plant.

New medical drugs have to be tested and trialled before being used to check that they are safe and effective.

New drugs are extensively tested for toxicity, efficacy and dose.

Preclinical testing is done in a laboratory using cells, tissues and live animals.

Clinical trials use healthy volunteers and patients.

- Very low doses of the drug are given at the start of the clinical trial.
- If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug.

Students are not expected to recall any specific tests or treatments but given appropriate information they should be able to explain how they work.

Students should be able to describe physical and chemical plant defence responses.

### **Practical skills**

WS 1.4

Evaluate the global use of vaccination in the prevention of disease

WS 1.6

Understand that the results of testing and trials are published only after scrutiny by peer review.

### **GCSE Biology Only**

WS 1.3

Appreciate the power of monoclonal antibodies and consider any ethical issues.

WS 1.4

The everyday application of scientific knowledge to detect and identify plant disease.

WS 1.4

The understanding of ion deficiencies allows horticulturists to provide optimum conditions for plants.

- In double blind trials, some patients are given a placebo.

### GCSE Biology Only

Monoclonal antibodies are produced from a single clone of cells. The antibodies are specific to one binding site on one protein antigen and so are able to target a specific chemical or specific cells in the body.

They are produced by stimulating mouse lymphocytes to make a particular antibody. The lymphocytes are combined with a particular kind of tumour cell to make a cell called a hybridoma cell. The hybridoma cell can both divide and make the antibody. Single hybridoma cells are cloned to produce many identical cells that all produce the same antibody. A large amount of the antibody can be collected and purified.

Monoclonal antibodies create more side effects than expected. They are not yet as widely used as everyone hoped when they were first developed.

(HT only) Plant diseases can be detected by:

- stunted growth
- spots on leaves
- areas of decay (rot)
- growths
- malformed stems or leaves
- discolouration
- the presence of pests.

(HT only) Identification can be made by:

- reference to a gardening manual or website
- taking infected plants to a laboratory to identify the pathogen
- using testing kits that contain monoclonal antibodies.

Plants can be infected by a range of viral, bacterial and fungal pathogens as well as by insects.

Knowledge of plant diseases is restricted to tobacco mosaic virus as a viral disease, black spot as a fungal disease and aphids as insects.

Plants can be damaged by a range of ion deficiency conditions:

- stunted growth caused by nitrate deficiency

- chlorosis caused by magnesium deficiency.

Knowledge of ions is limited to nitrate ions needed for protein synthesis and therefore growth, and magnesium ions needed to make chlorophyll.

	<p>Physical defence responses to resist invasion of microorganisms.</p> <ul style="list-style-type: none"> <li>•Cellulose cell walls.</li> <li>•Tough waxy cuticle on leaves.</li> <li>•Layers of dead cells around stems (bark on trees) which fall off.</li> </ul> <p>Chemical plant defence responses.</p> <ul style="list-style-type: none"> <li>•Antibacterial chemicals.</li> <li>•Poisons to deter herbivores.</li> </ul> <p>Mechanical adaptations.</p> <ul style="list-style-type: none"> <li>•Thorns and hairs deter animals.</li> <li>•Leaves which droop or curl when touched.</li> <li>•Mimicry to trick animals.</li> </ul>	
Vocabulary	<p><b>Agar gel</b> - widely used solid (gel) culture medium used for growing microorganisms</p> <p><b>Aphids</b> - insects that penetrate the plant phloem and feed on the dissolved food. They act as plant pathogens and are also vectors that carry pathogenic viruses, bacteria, and fungi into healthy plant tissue</p> <p><b>Binary fission</b> - reproduction by simple cell division, for example in bacteria</p> <p><b>Chlorosis</b> - the yellowing seen on the leaves of plants when they cannot make chlorophyll due to a lack of magnesium ions</p> <p><b>Communicable (infectious) disease</b> - disease caused by pathogens that can be passed from one organism to another</p> <p><b>Culture medium</b> - a liquid or gel used to support the growth of microorganisms or other cultures, often containing specific nutrients</p> <p><b>Inoculate</b> - introducing microorganisms to a culture medium, or introducing modified microorganisms into an individual to protect them against disease</p> <p><b>Microorganisms</b> - organisms that are usually single-celled and can only be seen using a microscope . They include bacteria, fungi, viruses and protists</p> <p><b>Mutation</b> - a change in the genetic material of an organism</p> <p><b>Non-communicable diseases</b> - are not infectious and cannot be passed from one organism to another</p> <p><b>Pathogens</b> - microorganisms that cause disease</p> <p><b>Sexually transmitted disease (STD)</b> - transmitted from an infected person to an uninfected person by unprotected sexual contact</p> <p><b>Vaccine</b> - dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person</p>	



	<p><b>Virus</b> - pathogens that are much smaller than bacteria and can only reproduce inside living cells of other organisms</p> <p><b>Clinical trials</b>- test potential new drugs on healthy and patient volunteers</p> <p><b>Hybridomas</b> - cells created during the production of monoclonal antibodies by the fusion of an antibody-specific lymphocyte and a tumour cell</p> <p><b>Placebo</b> - a medicine that does not contain the active drug being tested, used in clinical trials of new medicines</p> <p><b>Preclinical testing</b> - is carried out on a potential new medicine in a laboratory using cells, tissues, and live animals</p> <p><b>Vaccine</b> - dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person</p>
<b>Assessment</b>	

GCSE Biology		
	Summer term	
	<b>Preventing and treating disease</b>	
	<b>Construct:</b>	
<b>Source of knowledge</b>	<b>AQA Biology Third Edition</b>	
<b>Knowledge</b>	<p><i>4.3.1.6 Human defence systems</i></p> <p>Students should be able to describe the non-specific defence systems of the human body against pathogens, including the:</p> <ul style="list-style-type: none"> <li>• skin</li> <li>• nose</li> <li>• trachea and bronchi</li> <li>• stomach.</li> </ul> <p>Students should be able to explain the role of the immune system in the defence against disease.</p> <p>If a pathogen enters the body the immune system tries to destroy the pathogen.</p> <p>White blood cells help to defend against pathogens by:</p> <ul style="list-style-type: none"> <li>• phagocytosis</li> <li>• antibody production</li> </ul> <p>antitoxin production.</p> <p><i>4.3.1.7 Vaccination</i></p> <p>Students should be able to explain how vaccination will prevent illness in an individual, and how the spread of pathogens can be reduced by immunising a large proportion of the population.</p>	<p>Students will <b>apply</b> the knowledge by;</p>          <p>WS 1.4</p> <p>Evaluate the global use of vaccination in the prevention of disease.</p>

<p>Vaccination involves introducing small quantities of dead or inactive forms of a pathogen into the body to stimulate the white blood cells to produce antibodies. If the same pathogen re-enters the body the white blood cells respond quickly to produce the correct antibodies, preventing infection.</p> <p>Students do not need to know details of vaccination schedules and side effects associated with specific vaccines.</p> <p><i>4.3.1.8 Antibiotics and painkillers</i></p> <p>Students should be able to explain the use of antibiotics and other medicines in treating disease.</p> <p>Antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing infective bacteria inside the body. It is important that specific bacteria should be treated by specific antibiotics.</p> <p>The use of antibiotics has greatly reduced deaths from infectious bacterial diseases. However, the emergence of strains resistant to antibiotics is of great concern. Antibiotics cannot kill viral pathogens.</p> <p>Painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens.</p> <p>It is difficult to develop drugs that kill viruses without also damaging the body's tissues.</p> <p><i>4.3.1.9 Discovery and development of drugs</i></p> <p>Students should be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing.</p> <p>Traditionally drugs were extracted from plants and microorganisms.</p> <ul style="list-style-type: none"> <li>• The heart drug digitalis originates from foxgloves.</li> <li>• The painkiller aspirin originates from willow.</li> <li>• Penicillin was discovered by Alexander Fleming from the <i>Penicillium</i> mould.</li> </ul> <p>Most new drugs are synthesised by chemists in the pharmaceutical industry. However, the starting point may still be a chemical extracted from a plant.</p> <p>New medical drugs have to be tested and trialled before being used to check that they are safe and effective.</p> <p>New drugs are extensively tested for toxicity, efficacy and dose.</p> <p>Preclinical testing is done in a laboratory using cells, tissues and live animals.</p> <p>Clinical trials use healthy volunteers and patients.</p> <ul style="list-style-type: none"> <li>• Very low doses of the drug are given at the start of the clinical trial.</li> <li>• If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug.</li> </ul> <p>In double blind trials, some patients are given a placebo.</p>	<p>WS 1.6</p> <p>Understand that the results of testing and trials are published only after scrutiny by peer review.</p>
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#### 4.3.2.1 Producing monoclonal antibodies

Students should be able to describe how monoclonal antibodies are produced.

Monoclonal antibodies are produced from a single clone of cells. The antibodies are specific to one binding site on one protein antigen and so are able to target a specific chemical or specific cells in the body.

They are produced by stimulating mouse lymphocytes to make a particular antibody. The lymphocytes are combined with a particular kind of tumour cell to make a cell called a hybridoma cell. The hybridoma cell can both divide and make the antibody. Single hybridoma cells are cloned to produce many identical cells that all produce the same antibody. A large amount of the antibody can be collected and purified.

#### 4.3.2.2 Uses of monoclonal antibodies

Students should be able to describe some of the ways in which monoclonal antibodies can be used.

Some examples include:

- for diagnosis such as in pregnancy tests
- in laboratories to measure the levels of hormones and other chemicals in blood, or to detect pathogens
- in research to locate or identify specific molecules in a cell or tissue by binding to them with a fluorescent dye
- to treat some diseases: for cancer the monoclonal antibody can be bound to a radioactive substance, a toxic drug or a chemical which stops cells growing and dividing. It delivers the substance to the cancer cells without harming other cells in the body.

Students are not expected to recall any specific tests or treatments but given appropriate information they should be able to explain how they work.

Monoclonal antibodies create more side effects than expected. They are not yet as widely used as everyone hoped when they were first developed.

#### 4.3.3.1 Detection and identification of plant diseases

(HT only) Plant diseases can be detected by:

- stunted growth
- spots on leaves
- areas of decay (rot)
- growths
- malformed stems or leaves
- discolouration
- the presence of pests.

(HT only) Identification can be made by:

- reference to a gardening manual or website

WS 1.3

Appreciate the power of monoclonal antibodies and consider any ethical issues

WS 1.5

Evaluate the advantages and disadvantages of monoclonal antibodies.

WS 1.4

The everyday application of scientific knowledge to detect and identify plant disease.

WS 1.4

The understanding of ion deficiencies allows horticulturists to provide optimum conditions for plants.

	<ul style="list-style-type: none"> <li>taking infected plants to a laboratory to identify the pathogen</li> </ul> <p>using testing kits that contain monoclonal antibodies. Plants can be infected by a range of viral, bacterial and fungal pathogens as well as by insects.</p> <p>Knowledge of plant diseases is restricted to tobacco mosaic virus as a viral disease, black spot as a fungal disease and aphids as insects.</p> <p>Plants can be damaged by a range of ion deficiency conditions:</p> <ul style="list-style-type: none"> <li>stunted growth caused by nitrate deficiency</li> <li>chlorosis caused by magnesium deficiency.</li> </ul> <p>Knowledge of ions is limited to nitrate ions needed for protein synthesis and therefore growth, and magnesium ions needed to make chlorophyll</p> <p><b>4.3.3.2 Plant defence responses</b></p> <p>Students should be able to describe physical and chemical plant defence responses.</p> <p>Physical defence responses to resist invasion of microorganisms.</p> <ul style="list-style-type: none"> <li>Cellulose cell walls.</li> <li>Tough waxy cuticle on leaves.</li> <li>Layers of dead cells around stems (bark on trees) which fall off.</li> </ul> <p>Chemical plant defence responses.</p> <ul style="list-style-type: none"> <li>Antibacterial chemicals.</li> <li>Poisons to deter herbivores.</li> </ul> <p>Mechanical adaptations.</p> <ul style="list-style-type: none"> <li>Thorns and hairs deter animals.</li> <li>Leaves which droop or curl when touched.</li> </ul> <p>Mimicry to trick animals.</p>	
<b>Vocabulary</b>	<p><b>clinical trials</b> test potential new drugs on healthy and patient volunteers</p> <p><b>hybridomas</b> cells created during the production of monoclonal antibodies by the fusion of an antibody-specific lymphocyte and a tumour cell</p> <p><b>placebo</b> a medicine that does not contain the active drug being tested, used in clinical trials of new medicines</p> <p><b>preclinical testing</b> is carried out on a potential new medicine in a laboratory using cells, tissues, and live animals</p> <p><b>vaccine</b> dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person</p>	

Assessment	
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Year 9		
Summer Term		
Adaptations B16.1-16.8		
<p><b>Construct:</b> The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants and decomposing microorganisms and taken up by plants in photosynthesis.</p> <p>All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development.</p> <p>In order to continue to benefit from these services humans need to engage with the environment in a sustainable way. In this section we will explore how humans are threatening biodiversity as well as the natural systems that support it. We will also consider some actions we need to take to ensure our future health, prosperity and well-being.</p>		
Source of knowledge	<a href="#">T:\Science\Curriculum\KS4\BIOLOGY\AQA GCSE 1-9 2019\Year 9 New Curriculum\B7 Adaptations (DHO)</a> <b>AQA GCSE Biology Student Book. P258-275</b>	
Knowledge	<p>4.7.1 Adaptations, interdependence and competition</p> <p>4.7.1.1 Communities</p> <p>Students should be able to describe:</p> <ul style="list-style-type: none"> <li>different levels of organisation in an ecosystem from individual organisms to the whole ecosystem</li> <li>the importance of interdependence and competition in a community.</li> </ul> <p>Students should be able to, when provided with appropriate information:</p> <ul style="list-style-type: none"> <li>suggest the factors for which organisms are competing in a given habitat</li> <li>suggest how organisms are adapted to the conditions in which they live.</li> </ul> <p>An ecosystem is the interaction of a community of living organisms (biotic) with the non-living (abiotic) parts of their environment.</p> <p>To survive and reproduce, organisms require a supply of materials from their surroundings and from the other living organisms there.</p> <p>Plants in a community or habitat often compete with each other for light and space, and for water and mineral ions from the soil. Animals often compete with each other for food, mates and territory.</p>	<p>WS 2.6</p> <p>Recording first hand observations of organisms</p>



Students should be able to extract and interpret information from charts, graphs and tables relating to the effect of biotic factors on organisms within a community.

#### *4.7.1.4 Adaptations*

Students should be able to explain how organisms are adapted to live in their natural environment, given appropriate information.

Organisms have features (adaptations) that enable them to survive in the conditions in which they normally live. These adaptations may be structural, behavioural or functional.

Some organisms live in environments that are very extreme, such as at high temperature, pressure, or salt concentration. These organisms are called extremophiles. Bacteria living in deep sea vents are extremophiles.

MS 2c, 4a

Extract and interpret information from charts, graphs and tables.

## Vocabulary

### **abundance**

a measure of how common or rare a particular type of organism is in a given environment

### **adaptations**

special features that make an organism particularly well suited to the environment where it lives

### **community**

group of interdependent living organisms in an ecosystem

### **competition**

the process by which living organisms compete with each other for limited resources such as food, light, or reproductive partners

### **distribution**

where particular types of organisms are found within an environment

### **extremophile**

an organism that can survive and reproduce in extreme conditions

### **interdependence**

the network of relationships between different organisms within a community, for example each species depends on other species for food, shelter, pollination, seed dispersal, etc.

### **mean**

the arithmetical average of a series of numbers

### **median**

the middle value in a list of numbers

### **mode**

the number which occurs most often in a set of data

### **quadrat**

a sample area used for measuring the abundance and distribution of organisms in the field

### **quantitative sampling**

records the numbers of organisms rather than just the type

### **range**

the maximum and minimum values for the independent or dependent variables – important in ensuring that any patterns are detected

### **sample size**

the size of a sample in an investigation

### **transect**

a measured line or area along which ecological measurements are made



<b>Assessment</b>	Required practical 1 Topic test