

AQA Biology GCSE - Student Progress Sheet

Name:

Target:

Unit 4.3 – Infection and Response

4.3.1. Communicable Diseases

4.3.1.1. Communicable (Infectious) Diseases



a	I know that pathogens are microorganisms that cause infectious disease.			
b	I know that pathogens may be viruses, bacteria, protists or fungi that can infect plants or animals.			
c	I know that bacteria can produce poisons (toxins) that damage tissues and make us feel ill.			
d	I know that viruses live and reproduce inside body cells, which causes damage to the cell.			
e	I can explain how pathogens can be spread by direct contact, by water or by air.			
f	I can explain how the spread of disease can be reduced or prevented.			

4.3.1.2. Viral Diseases

a	I know that measles is a viral disease showing symptoms of fever and a red skin rash and that it is a serious illness that can be fatal if complications arise (which is why most young children are vaccinated against measles).			
b	I can describe how the measles virus is spread by air (by inhalation of droplets from sneezes and coughs).			
c	I know that HIV (Human Immunodeficiency Virus) infection initially causes a flu-like illness and that the virus attacks the body's immune cells (white blood cells) if it is not successfully controlled with antiretroviral drugs.			
d	I know that AIDS occurs when the body's immune system becomes so badly damaged it can no longer deal with other infections or cancers.			
e	I can explain how HIV is spread (by sexual contact or exchange of body fluids such as blood which occurs when drug users share needles).			
f	I know that TMV (Tobacco Mosaic Virus) is a widespread plant pathogen affecting many species of plants including tomatoes and that it gives a distinctive 'mosaic' pattern of discolouration on the leaves which affects the growth of the plant due to lack of photosynthesis.			

4.3.1.3. Bacterial Diseases

a	I know that Salmonella food poisoning is caused by bacteria that are spread by ingesting (eating) contaminated food.			
b	I can describe the symptoms of Salmonella food poisoning as; fever, abdominal cramps, vomiting and diarrhoea which are caused by the bacteria and the toxins they secrete.			
c	I know that, in the UK, poultry are vaccinated against Salmonella to control the spread.			
d	I know that gonorrhoea is a sexually transmitted disease (STD) that is caused by bacteria.			
e	I can describe the symptoms of gonorrhoea as; a thick yellow or green discharge from the vagina or penis and pain on urinating.			
f	I know that gonorrhoea was easily treated with penicillin (an antibiotic), until many resistant strains of the bacteria appeared.			



4.3.1.4. Fungal Diseases

a	I know that rose black spot is a fungal disease where purple or black spots develop on leaves, which often turn yellow and drop early.			
b	I know that rose black spot fungus affects the growth of the plant because photosynthesis is reduced.			
c	I can describe how rose black spot fungus is spread by water and air.			
d	I can explain how rose black spot fungus can be treated by using fungicides and/or removing and destroying the affected leaves.			

4.3.1.5. Protist Diseases

a	I know that the pathogens that cause malaria are protists.			
b	I know that malaria causes recurrent episodes of fever and can be fatal.			
c	I can describe the life cycle of the malarial protist, including the role of the mosquito.			
d	I can explain how the spread of malaria can be controlled by preventing mosquitos (the vector) from breeding and by using nets to avoid bites.			

4.3.1.6. Human Defence Systems

a	I can describe how the non-specific defence systems of the human body (including skin, nose, trachea and bronchi and stomach) protect against pathogens.			
b	I can explain how white blood cells use phagocytosis to defend against pathogens.			
c	I can explain how white blood cells produce antibodies to defend against pathogens.			
d	I can explain how white blood cells produce antitoxins to defend against pathogens.			

4.3.1.7. Vaccination

a	I know that a vaccine contains small quantities of dead or inactive forms of a pathogen.			
b	I can explain how having a vaccination stimulates the white blood cells to produce antibodies against a particular pathogen and that if the same pathogen then enters the body, the white blood cells are able to respond quickly to produce the correct antibodies, preventing infection.			
c	I can explain how the spread of pathogens can be reduced by immunising a large proportion of the population.			

4.3.1.8. Antibiotics and Painkillers

a	I know that antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing bacteria inside the body.			
b	I know that it is important that specific bacteria should be treated by specific antibiotics.			
c	I know that antibiotics cannot kill viral pathogens and that it is difficult to develop drugs that kill viruses without also damaging the body's tissues.			
d	I can describe how the use of antibiotics has greatly reduced deaths from infectious bacterial diseases, but the emergence of strains of bacteria that are resistant to antibiotics is of great concern.			
e	I know that painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens.			



4.3.1.9. Discovery and Development of Drugs

a	I can describe how, traditionally, drugs were extracted from plants and microorganisms, for example; <ul style="list-style-type: none"> • the heart drug digitalis originates from foxgloves; • the painkiller aspirin originates from the willow tree; • penicillin was discovered by Alexander Fleming from the Penicillium mould. 			
b	I can describe how most new drugs are synthesised by chemists in the pharmaceutical industry, but that the starting point may still be a chemical extracted from a plant.			
c	I know that new drugs have to be extensively tested for toxicity, efficacy and dose.			
d	I can describe how preclinical testing is done in a laboratory using cells, tissues and live animals.			
e	I can describe how clinical trials use healthy volunteers and patients and that very low doses of the drug are given at the start of a clinical trial.			
f	I know that if the drug is found to be safe after initial trials, further clinical trials are carried out to find the optimum dose for the drug.			
g	I know that, in double blind trials, some patients are given a placebo.			

4.3.2. Monoclonal Antibodies (Biology Only) (HT Only)

4.3.2.1. Producing Monoclonal Antibodies

a	I know that monoclonal antibodies are produced from a single clone of cells.			
b	I know that the antibodies produced 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.			
c	I know that specific antibodies are produced by stimulating mouse lymphocytes.			
d	I know that the lymphocytes are combined with a kind of tumour cell to make a cell called a hybridoma cell and that this hybridoma cell can both divide and make the antibody.			
e	I know that single hybridoma cells can be cloned to produce many identical cells that all produce the same antibody and that a large amount of the antibody can be collected and purified.			
c	I know that malignant tumour cells are cancers. They invade neighbouring tissues and spread to different parts of the body (via the bloodstream) where they form secondary tumours.			

4.3.2.2. Uses of Monoclonal Antibodies

a	I can describe some of the ways in which monoclonal antibodies can be used, including: <ul style="list-style-type: none"> • pregnancy tests; • measuring the levels of hormones and other chemicals in blood, or to detect pathogens; • locating or identifying specific molecules in a cell or tissue by binding to them with a fluorescent dye; • treating diseases such as cancer. 			
b	I can discuss the importance of monoclonal antibodies and evaluate the advantages and disadvantages associated with their use.			



4.3.3. Plant Diseases (Biology Only)

4.3.3.1. Detection and Identification of Plant Diseases

a	I know that plants can be infected by a range of viral (tobacco mosaic virus), bacterial and fungal (black spot fungus) pathogens as well as by insects (aphids).			
b	I know that plant diseases can be detected by: <ul style="list-style-type: none"> • stunted growth; • spots on leaves; • areas of decay (rot); • growths; • malformed stems or leaves; • discolouration; • the presence of pests. (HT Only) 			
c	I know that plant diseases can be identified by: <ul style="list-style-type: none"> • reference to a gardening manual or website; • taking infected plants to a laboratory to identify the pathogen; • using testing kits that contain monoclonal antibodies. (HT Only) 			
d	I know that plants can be damaged by a range of ion deficiency conditions, including <ul style="list-style-type: none"> • stunted growth caused by nitrate deficiency (affects protein synthesis and therefore, growth); • chlorosis caused by magnesium deficiency (affects production of chlorophyll). 			
e	I can describe how an understanding of ion deficiencies allows horticulturists to provide optimum conditions for plants.			

4.3.3.2. Plant Defence Responses

a	I can describe the physical defence responses plants use to resist invasion of microorganisms; <ul style="list-style-type: none"> • cellulose cell walls; • tough waxy cuticle on leaves; • layers of dead cells around stems (bark on trees) which fall off. 			
b	I can describe chemical defence responses used by plants; <ul style="list-style-type: none"> • antibacterial chemicals; • poisons to deter herbivores. 			
c	I can describe mechanical adaptations of plants; <ul style="list-style-type: none"> • thorns and hairs deter animals; • leaves which droop or curl when touched; • mimicry to trick animals. 			