KESTEVEN AND SLEAFORD HIGH SCHOOL

Biology Scheme of Learning

Year 10 – Term 1/Unit 5 and 6

Intent – Rationale

- Building on students understanding of diseases this unit focuses on communicable diseases. Students consider the different pathogens and the diseases they cause alongside the symptoms and treatments in humans and plants.
- Students will consider how to prevent and treat disease, including vaccination, antibiotics and painkillers. They will also consider how drugs are discovered and trialled for use. Biology only will learn about monoclonal antibodies and their uses.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
Topic B7.1 Cells and Tissues **Topic B8.11 Drugs and Health** **Topic B8.12 Microbes** **GCSE B1 Cells and their specialisation, diffusion, osmosis and active transport.**	• GCSE Units 6 Preventing and treating disease, 7 Non-communicable Disease, 13 Reproduction. • A Level 3 Cell structure, 5 Cell recognition and the immune system
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Base the content here on what you already know but there will be time in future to liaise further as part of our collaborative work	• B5 L6 & 7 GB4abgh • B5 L10, B6 L2 GB4e
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• FROM THE LIBRARY Fighting infectious disease; Sally Morgan-616.905 Fighting diseases; Robert Sneddon-616.9 Health and disease; Franklin Watts-301 Loos save lives; Seren Boyd-363 Story of the human body: The evolution of health and disease; Daniel Lieberman-612	•

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Biology Scheme of Learning

Year 10 – Term 1/Unit 5 and 6

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

Know

- Name some examples of viral, bacterial, fungal and protist diseases. Describe how the body stops pathogens getting in. State a variety of plant pathogens. state a variety of plant physical barriers.
- Describe what an antibody and an antigen are. Describe how antibiotics work. Name some drugs based on extracts from plants or microorganisms. Give the procedures used to trial a new drug in the correct order. Describe the structure of an antibody. State some uses of monoclonal antibodies.

Apply

- State the symptoms viral, bacterial, fungal and protist diseases. Explain why some diseases increase your risk of getting infections. How to detect plant diseases. Explain how plants defend themselves against herbivores.
- Explain why, if a large proportion of the population is vaccinated, the spread of the pathogen is reduced. Explain why it is difficult to develop drugs to treat viral infections. Analyse data to draw conclusions on the effectiveness of new antibiotics. Describe how a double blind trial is carried out. Explain why hybridoma cells are used to produce monoclonal antibodies.

Extend

- Suggest how to treat viral, bacterial, fungal and protist diseases. Explain how white blood cells protect you from disease. Explain how mineral deficiencies can cause non-communicable diseases in plants. State a variety of plant chemicals that are defences.
- Explain how vaccination works. Explain in detail how antibiotic-resistant bacteria arise. Suggest why mould naturally produces antibiotics. Describe in some detail how new medical drugs are tested and trialled for safety, effectiveness, toxicity, efficacy, and dose. Outline the procedure used to produce monoclonal antibodies. Describe the application of monoclonal antibodies in pregnancy testing.

What subject specific language will be used and developed in this topic?

Agrobacterium	Bacteria that infects plants and causes a growth known as a gall. Can be used by scientists to add genes to plant cells (genetic modification)
Antibodies	Chemicals produced by white blood cells which target particular bacteria and viruses and destroy them. Each pathogen requires specific antibodies to destroy it.
Antiseptic	A chemical that kills or destroys micro-organisms.
Antitoxins	Chemicals produced by white blood cells that counteract toxins.
Aphid	An insect pest of plants. They drink sap from plants, reducing the sugar available to the plant. They also carry pathogens that can infect the plant.
Bacteria	Single celled organisms that can live inside other living things and causes diseases.
Chemical Barrier	A defence mechanism in plants, the plant produces chemicals which destroy pathogens.
Chlorosis	The yellowing of plant leaves due to magnesium (and therefore chlorophyll) deficiency.
Communicable disease	A disease that can spread from one living thing to another.

What opportunities are available for assessing the progress of students?

- B5 L6 Disease presentation
- B5 L9 long answer question

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Culture	A pure colony of bacteria grown from a single bacterium.
Diet	The nutrients consumed by a living thing, an important factor in maintaining good health.
Disease	A malfunction of the body.
Disinfectant	A chemical designed and used for destroying micro-organisms.
Fungi	A complex micro-organism, responsible for a few diseases in animals and plants.
Gonorrhoea	A sexually transmitted disease, caused by infection with bacteria.
Health	The state of physical and mental well-being.
HIV	A virus that causes AIDS.
Hygiene	The use of techniques to reduce or prevent infection by micro-organisms.
Immune System	The body's internal defences against infections.
Incubation	Growing micro-organisms at a particular temperature.
Infection	An invasion of the body by a pathogen.
Interaction	The way in which different factors together affect health.
Malaria	A disease caused by a protist pathogen.
Measles	A viral disease which can be fatal, most children are protected by vaccination.
Mineral Deficiency	The lack of a nutrient or nutrients in the soil a plant is growing in, these usually cause the plant to grow poorly.
Non-communicable disease	A disease caused by lifestyle and/ or genetic factors rather than by a pathogen.
Pathogen	A micro-organism capable of causing a disease.
Physical Barrier	A layer of a living organism that prevents pathogens from gaining entry into the organism.
Protist	A complex, multicellular micro-organism.
Rose Black spot	A fungal disease of plants.
Salmonella	A bacterial disease, a form of food poisoning.
Tobacco Mosaic Virus	A viral disease that destroys the leaves of plants, reducing photosynthesis.
Toxin	A chemical produced by a bacterium that acts as a poison in an infected host.
Vaccine	An injectable medicine that triggers an immune response to prevent infection by a pathogen
Vector	An animal that helps transmit a pathogen from host to host.
Virus	A non-living pathogen, these infect and destroy living tissue.
White Blood Cell	The blood component responsible for defence against pathogens.

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Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
B5 L6 Viral, bacterial, fungal and protist diseases	Can I name some examples of viral, bacterial, fungal and protist diseases?	Can I suggest how to treat viral, bacterial, fungal and protist diseases?	
B5 L7 Viral, bacterial, fungal and protist diseases	Can I name some examples of viral, bacterial, fungal and protist diseases?	Can I suggest how to treat viral, bacterial, fungal and protist diseases?	
B5 L8 Human Defences	Can I describe how the body stops pathogens getting in?	Can I explain how white blood cells protect you from disease?	
B5 L9 Plant Diseases	Can I state a variety of plant pathogens?	Can I explain how mineral deficiencies can cause non-communicable diseases in plants?	
B5 L10 Plant defence responses	Can I state a variety of plant physical barriers?	Can I state a variety of plant chemicals that are defences?	
B6 L1 Vaccination	Can I describe what an antibody and an antigen are?	Can I explain how vaccination works?	
B6 L2 Antibiotics and painkillers	Can I describe how antibiotics work?	Can I explain in detail how antibiotic-resistant bacteria arise?	
B6 L3 Discovering drugs	Can I name some drugs based on extracts from plants or microorganisms?	Can I suggest why mould naturally produces antibiotics?	
B6 L4 Developing drugs	Can I give the procedures used to trial a new drug in the correct order?	Can I describe in some detail how new medical drugs are tested and trialled for safety, effectiveness, toxicity, efficacy, and dose?	
B6 L5 (Biology triple) Monoclonal antibodies	Can I describe the structure of an antibody?	Can I outline the procedure used to produce monoclonal antibodies?	
B6 L6 (Biology triple) Uses of monoclonal antibodies	Can I state some uses of monoclonal antibodies?	Can I describe the application of monoclonal antibodies in pregnancy testing?	
B5 and B6 test	Summative test		