Year 10
Subject: Biology
Topic/Unit: Topic 3: Infection and Response
When: Autumn Mid-Term

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit provides a vital understanding of how **pathogens**—including viruses, bacteria, fungi, and protists—cause infectious diseases in humans and plants. Following earlier studies of cell biology, students will now explore how organisms defend themselves against microscopic threats. This topic is essential for understanding modern medicine, from the history of antibiotics to the cutting-edge use of monoclonal antibodies in treating cancer.

Building on...building to:
This unit builds on Year 7 knowledge of **microbes** and Year 9 **cell structure**, specifically bacterial cells and binary fission. It prepares students for Topic 6, **Inheritance and Evolution**, where they will study genetic modification in pathogens.

Sequence summary:
- **Introduction to Pathogens:** Defining communicable diseases and transmission routes via air, water, and direct contact.
- **Specific Diseases:** In-depth study of viral (Measles, HIV, TMV), bacterial (Salmonella, Gonorrhoea), fungal (Rose Black Spot), and protist (Malaria) infections.
- **Human Defences:** Investigating primary barriers like skin and stomach acid, followed by the immune system's secondary response involving white blood cells.
- **Vaccination:** Explaining how dead or inactive pathogens stimulate **memory cells** to provide immunity and the importance of **herd immunity**.
- **Drugs and Development:** Discovery of penicillin and the rigorous stages of **clinical trials**, including toxicity, efficacy, and double-blind testing.
- **Monoclonal Antibodies (Triple Only):** Analysing the production of antibodies from **hybridoma cells** and their diagnostic uses, such as pregnancy tests.
- **Plant Defences(Triple Only)::** Examining physical, chemical, and mechanical adaptations plants use to resist invasion.

Key Vocabulary: Pathogen, Vector, Phagocytosis, Antibody, Antigen, Antitoxin, Vaccination, Antibiotic, Hybridoma, Placebo, and Double-blind trial.

Assessments:
- **Formative:** Mini-whiteboard review quizzes, "Doctor/Patient" diagnosis role-play, and immunity ordering tasks.
- **Summative:** Mid-unit test and Past Exam Questions (PEQs) covering the Malaria life cycle, drug trial stages, and monoclonal antibody uses.

Able and interested: Students will perform complex calculations, including **bacterial division rates** and surface area to volume ratios. They will evaluate the use of **genetically modified parasites** in vaccine development and research the global impact of antibiotic-resistant "Superbugs" like MRSA.

Inclusion, Personal Development and Wider Skills: Personal development is supported through discussions on **sexual health** (prevention of HIV and Gonorrhoea) and the ethics of using placebos in drug trials. Inclusion is ensured through **scaffolded worksheets** that reduce writing load and the use of visual aids for primary defence systems.

Homework and Independent Learning:
Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities. Teachers may also set consolidation and revision activities.