Year 9
Subject: Biology
Topic/Unit: Topic 1: Cell Biology
When: Autumn Term 1

Huntington School
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Overview: Why this? Why now?
Cells are the fundamental unit of all life forms. This unit is taught first as it provides the essential foundations for understanding how organisms grow, reproduce, and function. By mastering cell structure and transport mechanisms early, students develop the necessary laboratory skills and biological vocabulary required for more complex topics like human health and bioenergetics.

Building on...building to:
This unit builds on Key Stage 3 knowledge of basic plant and animal cells and the initial use of light microscopes. It leads directly to **Topic 2 (Organisation)** and **Topic 3 (Infection and Response)**, where cellular understanding is applied to organ systems and how the body defends itself against pathogens.

Sequence summary:
1. **Cell Structure:** Comparing eukaryotic (animal and plant) cells with the smaller, simpler prokaryotic bacterial cells.
2. **Microscopy:** Learning the parts of a light microscope and performing calculations using the magnification formula (Image = Actual x Magnification).
3. **Specialisation and Differentiation:** Investigating how cells become adapted for specific functions, such as sperm, nerve, and root hair cells.
4. **Culturing Microorganisms (Triple):** Using aseptic techniques to grow bacteria and testing the effectiveness of disinfectants.
5. **Cell Division:** Exploring chromosomes and the cell cycle, specifically how mitosis produces identical daughter cells for growth and repair.
6. **Stem Cells:** Evaluating the roles of embryonic and adult stem cells in medical treatments and therapeutic cloning.
7. **Transport in Cells:** Explaining how substances move via diffusion, osmosis, and active transport, and the importance of surface area to volume ratios in exchange surfaces.

Key Vocabulary:
Eukaryotic, Prokaryotic, Organelle, Resolution, Magnification, Binary Fission, Aseptic, Mitosis, Differentiation, Stem Cell, Therapeutic Cloning, Diffusion, Osmosis, Active Transport.

Assessments:
- **Low-stakes:** Regular "Do Now" retrieval tasks, mini-whiteboard quizzes, and a mid-topic assessment.
- **Required Practicals:** Standardised lab reports for RP1 (Microscopy), RP2 (Microbiology), and RP3 (Osmosis).
- **Summative:** A formal end-of-unit examination using AQA-style past paper questions.

Able and interested:
Opportunities include performing complex **order of magnitude** calculations, researching the ethics of therapeutic cloning, and investigating the science behind lab-grown meat.

Inclusion, Personal Development and Wider Skills:
Students develop **mathematical proficiency** through ratios and percentage change calculations. **Personal development** is fostered by debating the ethical and religious objections to stem cell research

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.