Scheme of Learning: Cell Biology

Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	Bonding & Structure	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

Topic Overview:

Cells are the basic unit of all forms of life. In this section we explore how structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells.

Lesson Sequence:

We start by describing the structure and function of generic plant and animal cells and then specialised cells. We then look at the differences between prokaryotic and eukaryotic cells before moving on to the genetic information cells have. There are two required practicals in this topic (magnification and aseptic Technique). We then describe the process of mitosis and finish with a comparison of the different methods of cell transport. Our focus skill for this topic is 'planning a method'.

Sequence of Lessons:	
1	Animal and Plant Cell Differences
2	Microscopes *Required Practical.* - **mid topic assessment** (likely 2 lessons)
3	Prokaryotes and Eukaryotes. **Literacy opportunity**
4	Specialised Cells
5	Aseptic Technique Required Practical.
6	Genetic Information
7	Mitosis
8	Stem cells (2 lessons)
9	Evaluation of therapeutic cloning
10	Diffusion- Concentration and temperature
11	Diffusion – Surface area
12	How does the concentration of sugar solution affect osmosis *Required Practical* - **mid topic assessment –** (likely 2 lessons)
13	Active Transport
14	Revision
15	Test

Resources:	
1	Microscope diagram, Cells labelling worksheet – both found in shared area. Microscopes, pre-prepared slides of basic animal and plant cells.
2	Microscopes, onion (cut into pieces), tweezers, iodine, slides, cover slips. Required Practical method sheet to print – in shared area. Mid topic assessment in shared area. Practice questions in shared area.
3	Diagrams of example eukaryote and prokaryote printed and in drawers. Could print table of differences for pupils to complete. Collect literacy sheet to read from drawers.
4	Table for pupils to complete on PowerPoint. Information sheets in drawers. Post it notes for plenary. Print exam question if needed.
5	Print RP sheets, print example plates for pupils to measure. Nutrient agar plates spread with bacteria, 3 types of filter paper discs soaked in mouthwash or TCP or antiseptic, disinfectant for desks, tape, forceps, pens. DEMO – agar plate, 'bacteria' culture, glass spreader, inoculating loop.
6	Print diagram and handout for pupils of chromosomes and paragraph. Can print and use DNA model origami if desired.
7	Could print table for pupils to fill out details of cell cycle. Print exam question.
8	Resources in shared area
9	People cards for ethics task to be printed and given to pupils in groups. Could use IT room.
10	Blocks of agar coloured with phenylalanine, 0.5M HCl, 1.0M HCl, water bath at 50 degrees. Print results table slide.
11	Demo – icing sugar, sugar cube in Bunsen flame. Print table for pupils to complete. Info sheets in drawer.
12	0.2, 0.4, 0.6, 0.8, 1.0M sugar solutions, cylinders of potato, high resolution balances. Print results table if needed.
13	Print root hair cell diagram to annotate and exam questions.
14	Question mat to print
15	Test paper in shared area

Supportive Reading:

Comprehension activity	From Prokaryotes to Eukaryotes information to read

Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of 'plan a method'