**B1 Cells Fundamentals Learning Journey**

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| 1 | Make cell slide and label animal cell parts.  **Membrane** – controls in/out cells  **Nucleus** – controls cell, contains DNA/Genetic material  **Cytoplasm** – jelly like, where chemical reactions occur  **Mitochondria** – site of **respiration** providing cell with energy  **Ribosome** – site of protein synthesis |
| 2 | Make onion cell slide and label plant cell parts.  **Permanent Vacuole** – stores cell sap  **Cell wall** (**cellulose**) – gives rigidity and support  **Chloroplast** – contains **chlorophyll** to trap light for photosynthesis |
| 3 | **Light microscopes** use light to form image. Lower **resolution**, lower **magnification** BUT can see **colour**.  Used to see cells and **larger subcellular** structures.  **Electron microscopes** use a **beam of electrons** to form an image. Higher **resolution**, higher **mag**. But black and white.  Used to see smallest of **organelles**. |
| 4 | Know how to rearrange the magnification equation.  **Magnification = image size/object size.**  Convert between units; 1 mm = 1000 micrometres. |
| 5 RP | Know that a cell drawing should; be drawn in **pencil** using clear **unbroken lines**, take up at least **half the page**, include a **title** and **labels**, be drawn in proportion and **not include colour or shading**.  Pupils apply knowledge and practical skills to make slide and complete cell drawing. |
| 6 | **Differentiation** is the process by which cells become **specialised**.  Pupils will need to identify and explain how and why the following cells have become specialised:  Sperm Cell,  Nerve Cell,  Muscle Cell,  Red Blood Cell,  Root Hair Cell,  Palisade Cell,  Xylem and Phloem Cells. |
| 7 | **Stem Cells** are **undifferentiated** cells.  In humans (animals) they are fund in bone **marrow** and **embryos** (more **versatile**).  They can be used for therapeutic cloning, growing of organs and to treat health problems such as diabetes and paralysis but there are ethical concerns.  In **plants** found at the **Meristems** (growing tips) and are used for cloning. |
| 8 | Know that **Prokaryotes** don’t have a nucleus but have **small rings of DNA** called **plasmid**s and a **single loop of DNA**. Also have cell wall, membrane and cytoplasm.  Also are smaller and don’t possess mitochondria or chloroplasts.  Animal and Plant cells are Eukaryot**es** (**DO have a nucleus**). |
| 9 | **Eukaryotes** have genetic material/**DNA** in the **nucleus.**  DNA is a **double helix** and acts a blueprint for building bodies.  Short length of DNA = **gen**e and codes for one type of **protein**.  **Different forms** of the same gene = **alleles**.  **DNA** is coiled up into **chromosomes** which are **in pairs** – one coming from each parent. There are **23 pairs in human cells**. |
| 10 | Know that **Mitosis** is cell division of **body cells** for growth and development.  The c**hromosomes** are **replicated** – copies are made.  **Chromosomes** and their copies **line up** along the centre of the cell and one of each pair are **pulled to opposite ends** of the cells.  **One cell** becomes **2 identical** (clone) **cells**. Because of this used in **asexual** reproduction. |
| 11 | **Binary Fission** is how **Prokaryotic Cells replicate**.  Cell gets bigger, copies **plasmids** and single strands of DNA and pull to opposite ends of cell. Cell splits leaving two **identical copies** of the cell.  **Very fast** = as quick as once every 20 minutes. |
| 12 | **Culturing cells** in a lab is possible so long as **aseptic technique** is used.  **Lawns** of **bacteria** can be produced to investigate the effects of antibiotics etc.  Pupils follow aseptic technique and set up Required Practical. |
| 13 | Pupils calculate size of **inhibition zone** to investigate effectiveness of **antiseptic** solutions. Required Practical. |
| 14 | **Diffusion is** the **random**, **passive**, **net movement of particles** from an area of high concentration to an area of low concentration.  Diffusion is how:  **Oxygen** can get from lungs into **red blood cells**.  **Carbon dioxide** can move from **plasma to lungs**.  **Neurotransmitters** cross the synapse.  **Gases** can enter and leave the leaves of **plants**. |
| 15 | Know that **diffusion** happens **faster**:  **Over a large surface** so when there is a large surface area to volume ratio,  When **membranes** are **thin**,  When there is a (good) **transport system** which maintains the concentration gradient. |
| 16 | Explain that **larger organisms** maintain rapid diffusion using **exchange surfaces**.  Describe and explain functioning of **alveoli**, **vill**i, **leaves**, **gills**. |
| 17 | **Osmosis** is movement of **water** molecules across a **partially permeable membranes** from an area of high water concentration to low water concentration.  Explain osmotic effect on cells. |
| 18&19 | Apply knowledge and practical skills to collect evidence from Required Practical and explain results obtained. |
| 20 | **Active Transport** is the process of absorbing particles **against** the **concentration** **gradient**.  It requires **energy** and so cells/organs which carry out this process have plenty of **mitochondria**.  Occurs in **Root Hairs** to absorb minerals from **very dilute soil water**.  In animals occurs in the **kidney tubules** (glucose reabsorption) and in the small intestine to absorb all **digested food molecules**. |