**IB Biology Chapter 1 Notes:** Introduction to Cells (1.1) **NAME:**

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| **Word** | **Definition** |
| **Unicellular** | Living things made of one cell |
| **Organism** | A living thing |
| **Organelle** | A small part of a cell that does a specific function |
| **Multicellular** | Living thing made of many cells |
| **Metabolism** | Chemical reactions that take place inside cells |
| **Homeostasis** | Maintaining a stable internal environment (including inside cells) |
| **Excretion** | Releasing waste |
| **Nutrition** | Gaining energy |
| **Molecules** | Multiple atoms that are bonded together |
| **Specialization** | Having a specific role or function |
| **Differentiation** | The process of a cell becoming specialized by expressing selected genes |
| **Surface Area-to-Volume Ratio** | The ratio of cell surface area to internal volume. Cells seek to maximize the amount of surface area per unit of volume. |

1.1.1 According to the cell theory, living organisms are composed of cells

1.1.2 Organisms consisting of only one cell carry out all functions of life in that cell

1.1.3 Surface are to volume ratio is important in the limitation of cell size

1.1.4 Multicellular organisms have properties that emerge from the interaction of their cellular components

1.1.5 Specialized tissues can develop by cell differentiation in multicellular organisms

State common features of all cells:

Outline the seven characteristics / functions of life shown by unicellular organisms:

Explain how the *Surface Area : Volume* ratio limits cell size (i.e. nutrient absorption, waste removal, and heat transfer):

As the cell grows larger, the membrane Surface Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the cell’s Volume also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but the SA : Volume ratio \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Describe what is meant by an **emergent property**:

1.1.6 Differentiation involves the expression of some genes and not others in the cell’s genome

1.1.8 Question the cell theory using atypical examples, including striated muscle, giant algae and aseptate fungal hyphae

1.1.9 Investigate functions of life in Paramecium and one named photosynthetic unicellular organism

1.1.12 Use a light microscope to investigate the structure of cells and tissues.

1.1.13 Draw cell structures as seen with the light microscope.

Atypical Example 1: Striated muscle tissue

Atypical Example 2: Giant algae

Atypical Example 3: Aseptate fungal hyphae

Examples of how *Paramecium* carry out functions of life:

Examples of how *Chlamydomonas* carry out functions of life:



Label the parts of the light microscope:

Draw and label a sample cell following the IB drawing and labeling rules on page 5:

1.1.14 Calculate the magnification of drawings and the actual size of structures shown in drawings or micrographs.

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| **Unit** | **Abbreviation** | **Metric Equivalent** **Whole Scientific Notation** |
| **kilometer** | km | 1000 m | 103 m |
| **meter** | m | 1 m | 1 m |
| **centimeter** | cm | .01 m | 10-2 m |
| **millimeter** | mm | 0.001 m | 10-3 m |
| **micrometer** | μm | 0.000001 m | 10-6 m |
| **nanometer** | nm | .000000001 m | 10-9m |

Outline the equation to calculate the **Magnification** of an image:

**Example:** If the drawn length of a cell is 30 mm, but the actual size of the cell is 3 μm, calculate the magnification of the image—show work!