

TOPIC 1: CELL BIOLOGY

1.1. Introduction to cells

Cell theory:

- All living things are composed of cells
- The cell is the smallest unit of life
- Cells only arise from pre-existing cells

Atypical examples

- **Striated muscle** → (challenge: one nucleus) long and multi-nucleated
- **Fungal hyphae** → (challenge: single unit) very large, multi-nucleated, continuous cytoplasm
- **Glaciar algae** → (challenge: simple and small) gigantic, complex form

Functions of life (MR TIGRIN)

1. **Metabolism** – all the chemical reactions in the cell which are responsible for all the actions of organisms (e.g. respiration)
2. **Response** – living things can respond to changes in the environmental conditions
3. **Homeostasis** – the maintenance and regulation of internal cell conditions (e.g. water and pH)
4. **Growth** – living things can grow or change in size/shape
5. **Reproduction** – living things reproduce offspring
 - **Sexual reproduction** (two parents)
 - **Asexual reproduction** (one parent)
6. **Excretion** – the removal of metabolic waste
7. **Nutrition** – feeding by either the synthesis of organic molecules (e.g. photosynthesis) or the absorption of organic matter

Surface Area : Volume

Plasma membrane is responsible for import/export in the cell.

SMALLER THE CELL:

- Better to **lose heat** so that enzymes do not denature
- Greater SA:Vol ratio for diffusion → **cell more efficient**
- Diffusion pathway is shorter → cell more efficient

GREATER THE CELL:

- Decreased SA:Vol ratio → cell conserve better heat

Example 1: Intestine folded covered of villi and microvilli → create larger SA:Vol → greater rate of absorption

Example 2: Lungs made of alveoli → create larger SA:Vol

Magnification Formula



$$1\text{mm} = 1000\mu\text{m} \text{ (micrometres)}$$

$$1\text{mm} = 1.000.000\text{nm} \text{ (nanometres)}$$

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M Tight



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 - The Rise of Digital Reading Ib Biology Sl Paper 23
 - Advantages of eBooks Over Traditional Books
2. Identifying Ib Biology Sl Paper 23
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Ib Biology Sl Paper 23
 - User-Friendly Interface
4. Exploring eBook Recommendations from Ib Biology Sl Paper 23
 - Personalized Recommendations
 - Ib Biology Sl Paper 23 User Reviews and Ratings

- Ib Biology Sl Paper 23 and Bestseller Lists
- 5. Accessing Ib Biology Sl Paper 23 Free and Paid eBooks
 - Ib Biology Sl Paper 23 Public Domain eBooks
 - Ib Biology Sl Paper 23 eBook Subscription Services
 - Ib Biology Sl Paper 23 Budget-Friendly Options
- 6. Navigating Ib Biology Sl Paper 23 eBook Formats
 - ePub, PDF, MOBI, and More
 - Ib Biology Sl Paper 23 Compatibility with Devices
 - Ib Biology Sl Paper 23 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Ib Biology Sl Paper 23
 - Highlighting and Note-Taking Ib Biology Sl Paper 23
 - Interactive Elements Ib Biology Sl Paper 23
- 8. Staying Engaged with Ib Biology Sl Paper 23
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Ib Biology Sl Paper 23
- 9. Balancing eBooks and Physical Books Ib Biology Sl Paper 23
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Ib Biology Sl Paper 23
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Ib Biology Sl Paper 23
 - Setting Reading Goals Ib Biology Sl Paper 23
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Ib Biology Sl Paper 23
 - Fact-Checking eBook Content of Ib Biology Sl Paper 23
 - Distinguishing Credible Sources

13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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