Topic: Growth in Living Organisms

This unit explores how living organisms increase in size and mass over time, emphasizing the biological processes that drive growth and the factors that influence it. It highlights the differences between plant and animal growth, the role of cell division, and how growth is measured and interpreted in scientific contexts.

Key areas of focus include:

Principles of Growth

- Definition of growth as an irreversible increase in size and dry mass.
- Role of mitosis and cell enlargement in growth.
- Characteristics of growth: irreversible, measurable, and exclusive to living organisms.

Measuring Growth

- Common parameters: height, length, wet mass, dry mass, leaf count, and population size.
- Importance of dry mass as the most accurate indicator.
- Use of growth curves to visualize changes over time.

Types and Patterns of Growth

- Internal vs external growth.
- Sigmoid (S-shaped) growth curves and their phases: lag, log, decelerating, stationary, and decline.
- Differences in growth patterns between plants and animals.

Growth in Plants

- Meristematic regions: apical, lateral, and intercalary meristems.
- Role of cambium in secondary growth.
- Indeterminate growth and seasonal variation in plant development.

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Growth in Animals

- Determinate growth ending at maturity.
- Cell division throughout developing tissues.
- Compact body structure resulting from uniform growth.

Seed Structure and Germination

- Anatomy of dicotyledonous seeds: radicle, plumule, cotyledons, testa, micropyle, and hilum.
- Functions of seed components in protection, nutrition, dormancy, and dispersal.
- Germination process: water uptake, enzyme activation, food breakdown, solute translocation, and emergence of seedling structures.

By the end of this topic, students should be able to:

- Define growth and explain its biological basis.
- Identify and describe methods used to measure growth.
- Interpret growth curves and explain their phases.
- Compare growth in plants and animals, including structural and functional differences.
- Describe the structure and function of dicotyledonous seeds.
- Outline the stages and requirements of seed germination.

This topic builds foundational understanding of how organisms develop and adapt, linking cellular processes to observable changes in form and function.

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