GRADE 11 STUDY GUIDE | 2025

Tissues, Organs and Systems

Life Sciences

1. Animal Tissues

- Epithelial tissue: covers surfaces; lines organs; protection, absorption, secretion. Types: squamous, cuboidal, columnar
- Connective tissue: supports and connects body parts. Types: bone, cartilage, blood, adipose (fat), tendons, ligaments
- Muscle tissue: contraction and movement. Types: skeletal (voluntary), cardiac (involuntary, heart), smooth (involuntary, organs)
- Nervous tissue: transmits electrical signals. Consists of neurons (nerve cells) and glial cells (support cells)

2. Plant Tissues

- Meristematic tissue: undifferentiated cells capable of division; found in root tips, shoot tips (apical), and lateral meristems for thickening (cambium)
- Epidermis: outer layer; protection; cuticle prevents water loss; stomata for gas exchange; root hair cells for absorption
- Vascular tissue: Xylem (water and mineral transport -- one-way, upward) | Phloem (food/sugar transport -- bidirectional)
- Ground tissue: pith and cortex; photosynthesis (in leaves), storage, support (parenchyma, collenchyma, sclerenchyma)

3. Levels of Organisation

Cell => Tissue => Organ => Organ system => Organism

Each level has emergent properties that the level below it does not have. An organ is made of different TISSUES working together. An organ SYSTEM is made of organs working together.

4. Digestion (Human Digestive System)

- Mouth: mechanical digestion (chewing); salivary amylase breaks down starch to maltose
- Oesophagus: muscular tube; peristalsis moves food to stomach
- Stomach: churning (mechanical); pepsin (protease) breaks protein; HCl kills bacteria and activates pepsin
- Small intestine (duodenum + ileum): main site of digestion and absorption; bile emulsifies fat; pancreatic enzymes (lipase, protease, amylase)
- Villi and microvilli: increase surface area for absorption; capillaries absorb amino acids/glucose; lacteals absorb fatty acids

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Large intestine: water reabsorption; faeces formation; no significant digestion