

# MENTOR HIGH SCHOOL-KITENDE

## S.5 Biology Mid-Term II 2025 – Scoring Grid

This scoring grid is designed to guide the assessment of the S.5 Biology Mid-Term II Exam 2025. It breaks down each task by item, indicating the skill assessed, expected response, and score allocation.

Item	Sub-task	Skill Assessed	Expected Response	Scores
1	a	Knowledge & Understanding	Identification and explanation of phloem/xylem functions and impact of girdling	5
1	b	Analysis & Application	Reasoned explanation of swelling above girdle and reduced growth below	5
1	c	Evaluation & Solution	Prediction of long-term effects on fruiting and proposed mitigation	5
2	a	Knowledge	Identification and description of relevant tissues (epithelial, connective, blood)	5
2	b	Explanation & Interpretation	Inflammatory response: swelling, vasodilation, capillary activity	5
2	c	Prediction & Problem-Solving	Role of fibroblasts, impaired healing, and	5

			intervention strategy	
3	a	Observation & Troubleshooting	Misuse of stain, poor focusing, diaphragm misadjustment	4
3	b	Comparison & Explanation	Plant vs. animal cell structure-function differences	5
3	c	Advanced Knowledge	Details seen via electron microscopy (organelles, ultrastructure)	4
4	a	Reasoning from Visual Data	Deductions based on internal failure in secretory cell	5
4	b	Adaptation & Environment	Chloroplast efficiency loss, adaptation mechanisms	5
4	c	Comparative Physiology	Mitochondrial impact on different cells; compensation	5

Total Scores: 68

### ITEM 1:

#### **Plant Tissues and Girdling Experiment** (15 scores)

##### (a) **Structures Affected and Their Functions** (5 scores)

**Phloem** removed during girdling (1 mark)

Phloem transports photosynthates (sugars) from leaves to roots (1 score)

**Xylem** remains intact and continues to transport water and minerals (1 score)

**Cambium** layer also affected—may hinder secondary growth (1 mark)

Overall impact on transport and growth due to lack of downward sugar movement (1 score)

##### (b) **Cause of Swelling and Reduced Growth** (5 scores)

Swelling occurs due to **accumulation of sugars** above the girdled area (1 score)

Sugars cannot move past the girdled point without phloem (1 score)

Reduced growth below the girdle due to lack of carbohydrates reaching roots (1 score)

Roots become energy-deprived, leading to weakened function (1 score)

Yellowing leaves indicate nutrient imbalances and early senescence (1 score)

**(c) Effect on Orchard Trees and Management** (5 scores)

**Long-term:**

Reduced fruit yield or tree death due to blocked sugar transport (1 score)

Trees will have weak roots and may show stunted growth (1 score)

**Management:**

Avoid girdling cuts or train workers on pruning techniques (1 score)

If accidental, perform bridge grafting to restore phloem continuity (1 score)

Emphasize monitoring and early detection to prevent irreversible damage (1 score)

**ITEM 2:**

**Animal Tissue Response to Injury** (15 scores)

**(a) Tissues and Their Roles** (5 scores)

**Epithelial tissue:** provides barrier against infection (1 score)

**Connective tissue** (including fibroblasts): produces collagen for repair (1 score)

**Blood:** platelets for clotting; WBCs for immune response (1 score)

**Muscle tissue:** may contract to reduce bleeding (1 score)

**Nerve tissue:** transmits pain signals to protect area (1 score)

**(b) Swelling and Redness** (5 scores)

Capillaries dilate due to histamine release (1 scores)

Increased blood flow causes redness and warmth (1 score)

Fluid leaks into tissue space causing swelling (1 score)

WBCs migrate to fight infection (1 score)

Pain may result from pressure on nerve endings (1 score)

**(c) Fibroblast Disorder Effects and Intervention (5 scores)**

Impaired collagen production slows tissue repair (1 score)

Wounds remain open or heal improperly (1 score)

Risk of infection increases due to delayed closure (1 score)

Medical intervention: growth factor therapy or fibroblast injections (1 score)

Wound care and antibiotics to prevent infection (1 score)

**ITEM 3:**

**Microscopy and Cell Comparison (13 scores)**

**(a) Daniel's Slide Problems (4 scores)**

Excess iodine masked cell structures (1 score)

Failure to adjust diaphragm led to poor contrast (1 score)

Incorrect focusing caused blurry image (1 score)

Possibly used too thick a section of onion tissue (1 score)

**(b) Onion vs. Cheek Cells (5 scores)**

Onion cells have cell walls; cheek cells do not (1 score)

Onion cells have large vacuoles; cheek cells have small/none (1 score)

Cheek cells have no chloroplasts; onion cells may have plastids (1 score)

Onion cells are regular and brick-shaped; cheek cells are irregular (1 score)

Differences support plant structure vs. animal protection/absorption (1 score)

**(c) Using Electron Microscope (4 scores)**

Can observe mitochondria, ribosomes, rough ER (1 score)

Detailed nuclear membrane and chromatin seen (1 score)

Helps understand energy use, protein synthesis, and cell function (1 score)

Greater resolution clarifies organelle arrangement (1 score)

**ITEM 4:**

**Cell Structure and Function (15 scores)**

**(a) Failure in Cell X (Secretory Cell) (5 scores)**

Disruption in protein synthesis pathway (1 score)

Ribosomes or RER may malfunction (1 score)

Golgi body fails to modify/package enzymes (1 score)

Lack of ATP due to defective mitochondria (1 score)

Overall, secretory activity stops affecting digestion (1 score)

**(b) Cell Y Adaptation to Shade (5 scores)**

Chloroplasts become less useful due to lack of light (1 score)

May reduce in number or function over time (1 score)

Larger surface area or thinner leaves for more light absorption (1 score)

Increase in accessory pigments to capture low-intensity light (1 score)

Could shift metabolism to conserve energy (1 score)

**(c) Impact of Fewer Mitochondria in Both Cells (5 scores)**

Cell X: reduced ATP, poor enzyme secretion (1 score)

Cell Y: reduced photosynthesis support and transport (1 score)

Cell X may increase glucose intake or up regulate glycolysis (1 score)

Cell Y may rely more on passive transport or adjust vacuole activity (1 score)

Both may initiate mitochondrial biogenesis if possible (1 score)

**END**

