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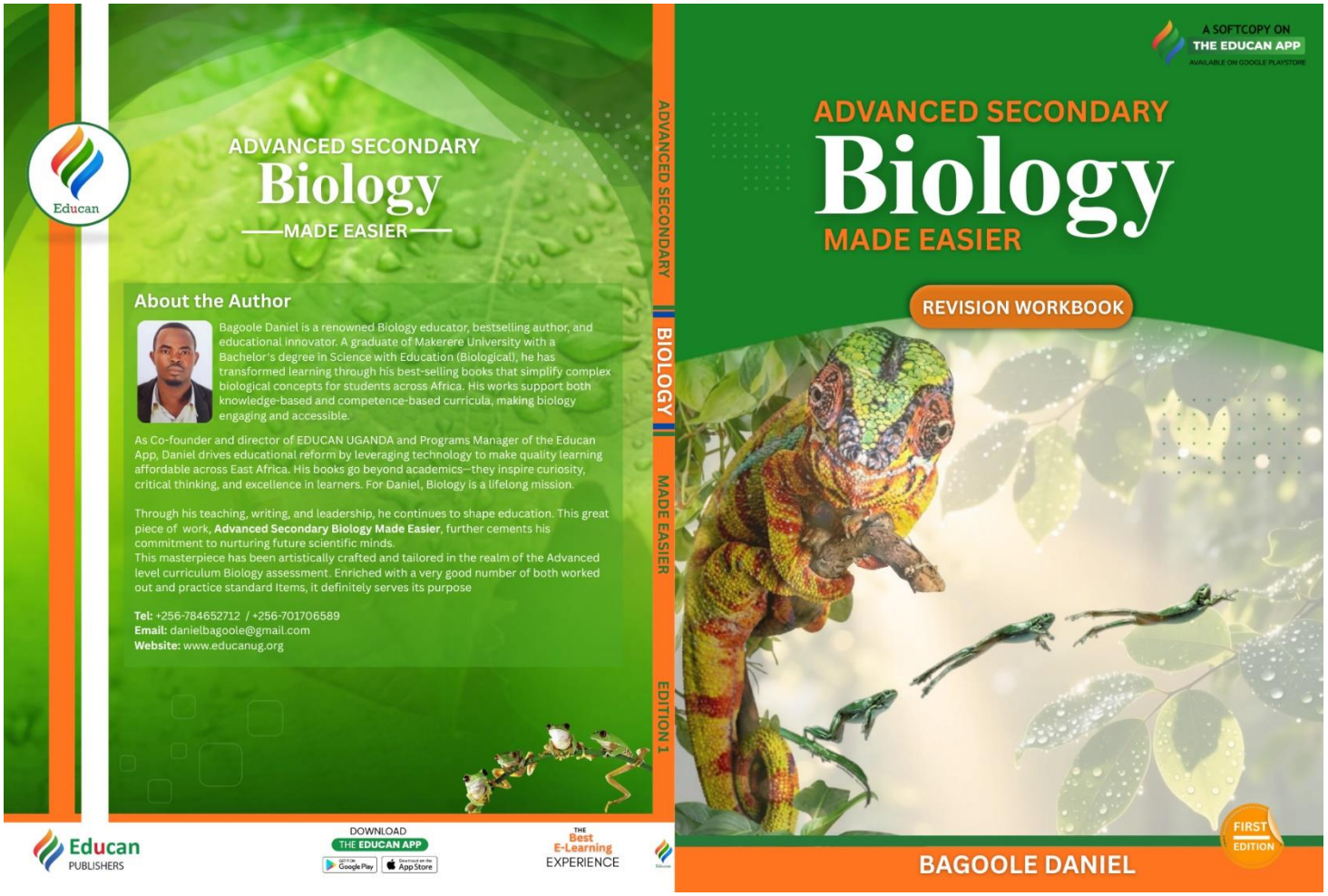
BIOLOGY P530/1

(Theory)

This is an extract from one of our unmatched masterpieces, "**Advanced Secondary Biology Made Easier**", a student's revision manual, tailored for the ease advanced secondary Biology, through Item-Response approach.

The Items are standard and drafted basing on the syllabus and assessment objectives. There are **four** sections. Each section begins with at least, three complete standardised worked out items, followed by a series of Practice Items for the student to get grounded in that section / Construct



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PLANT STRUCTURE, PHYSIOLOGY AND ADAPTATION

Objective

By the end of this section, you should be able to evaluate plant structure and physiology by analysing structural adaptations and photosynthetic pathway differences in C_3 and C_4, plant adaptations (to water availability), environmental influence on photosynthesis, growth, photoperiodism, and the hormonal control of growth, to promote sustainable agricultural practices that improve crop yield and food security

Topics Involved:

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Practice Item 28

The invasive shrub *Lantana camara* is rapidly spreading through the savannah grasslands of Lake Mburo National Park, outcompeting native grasses and reducing grazing land for wildlife like zebras and impalas. Park ecologists note that *Lantana* has multiple adaptations**:** *it produces allelopathic chemicals that inhibit the germination of other plants, its leaves are hairy and thick, and it flowers and sets seed year-round*. Meanwhile, the native grasses, which are mostly C4 plants, are struggling to recover after seasonal fires, which have also become less frequent.

Task:
(a) Describe the structural adaptations of *Lantana camara* that make it highly tolerant to the park's conditions of high light intensity and periodic water stress.
(b) (i) Native savannah grasses are typically C4 plants. Explain the physiological advantages this pathway gives them under hot, high-light conditions.

(ii) Explain why the advantages of the native savannah grasses, mentioned in b(i) above, are being nullified by the *Lantana* invasion.
(c) Suggest an ethical, ecological and sustainable management plan for the park authorities that uses biological knowledge to control *Lantana* and restore the native grassland ecosystem.

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GENETICS, EVOLUTIONARY AND ECOLOGICAL DYNAMICS

Objective

By the end of this section, you should be able to evaluate inheritance patterns, evolutionary mechanisms, and ecological interactions by analysing Mendelian and non-Mendelian genetics, species evolution, speciation, resistance, population dynamics, ecosystem balance, and carbon emissions, to inform sustainable strategies for managing invasive species, promoting food security, and mitigating climate change.

Topics Involved:

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Practice Item 42

A research team from the Uganda Wildlife Authority is studying a forest butterfly, *Bicyclus safitza*, in Mabira Central Forest Reserve. They've discovered a fascinating genetic story. Adult wing colour has multiple alleles: $\mathbf{W^B}$ (*Blue iridescence*), $\mathbf{W^P}$ (*Plain brown*), and **w** (*white*). The dominance hierarchy is $W^B > W^P > w$.

Even more interesting, this wing colour gene is linked to a gene controlling caterpillar colour (**C**), where green (**C**) is dominant to brown (**c**). Data comes from a cross between a pure-breeding Blue-winged, Green-caterpillar butterfly and a pure-breeding Plain-winged, Brown-caterpillar butterfly. The F1 were all Blue-winged, Green-caterpillar.....
.....(*Find more in*; **Advanced Secondary Biology made Easier**")

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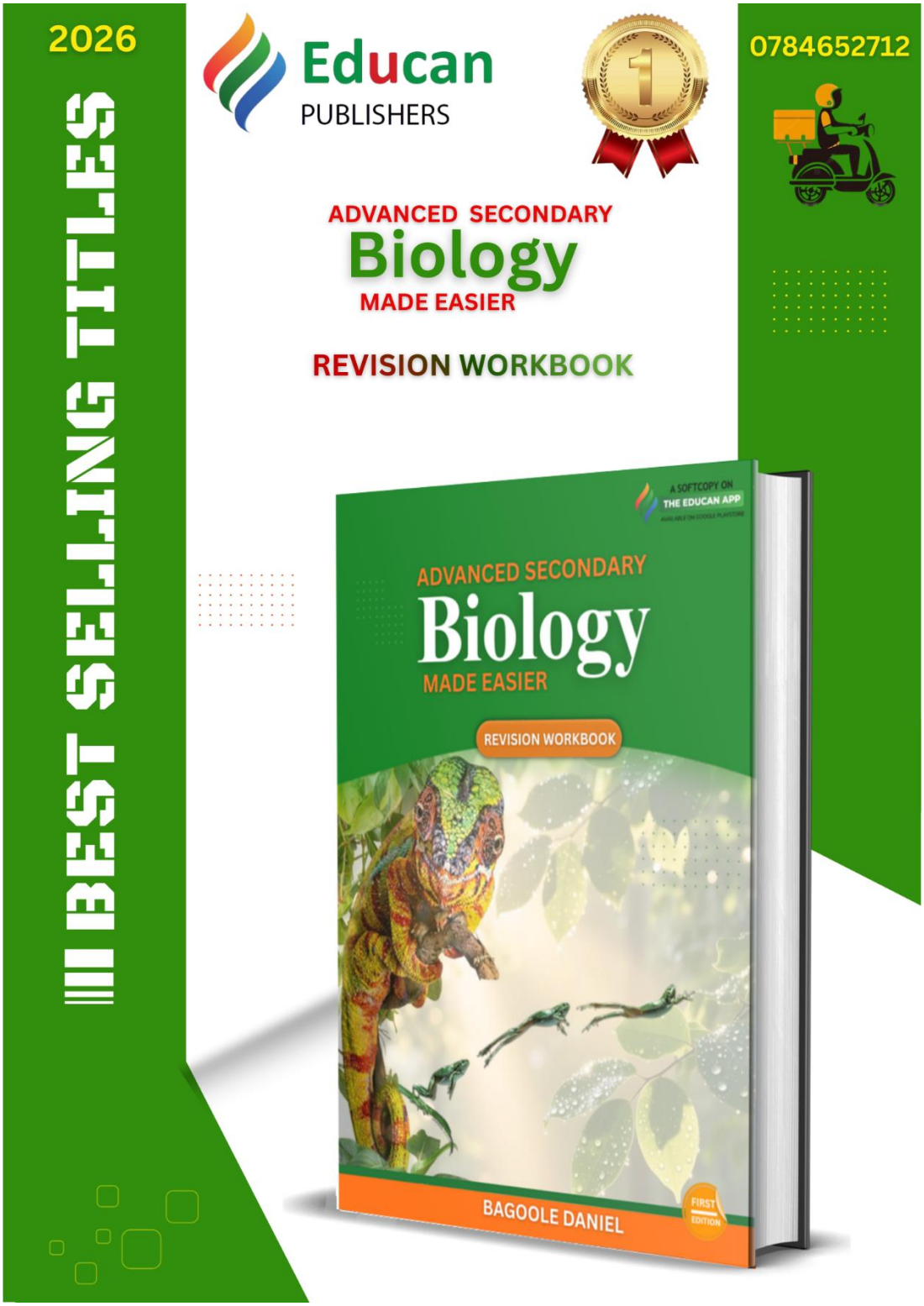

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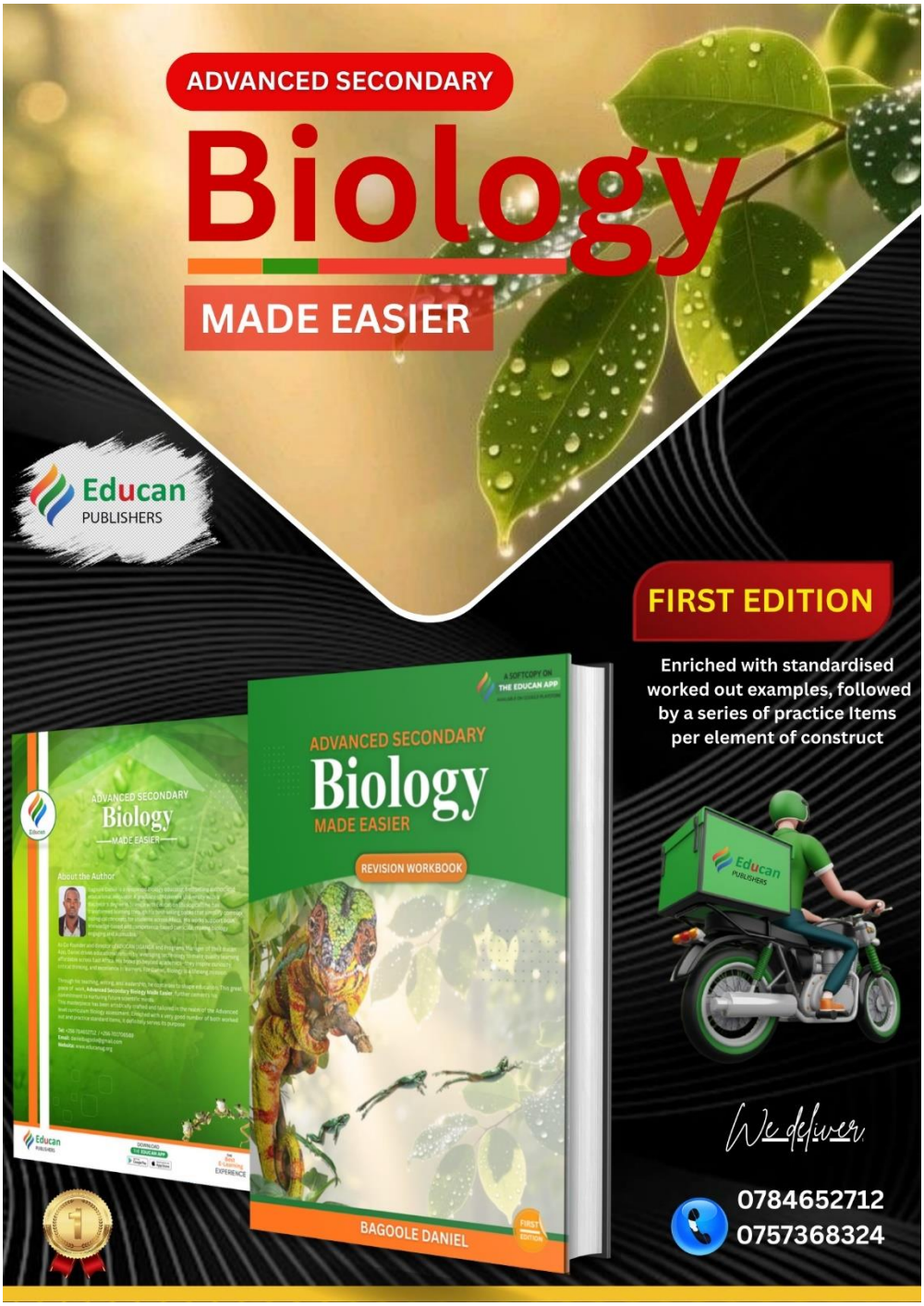

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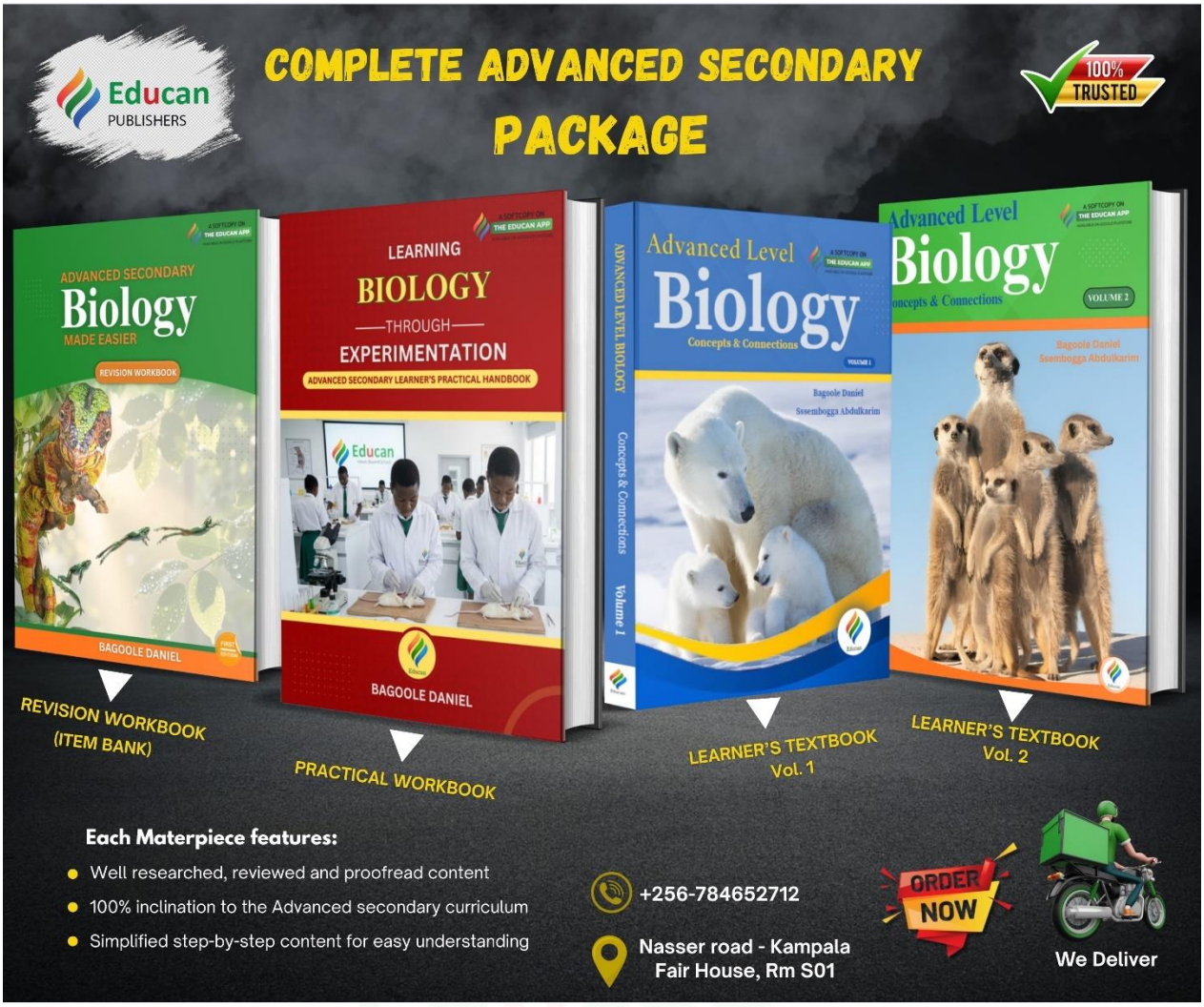

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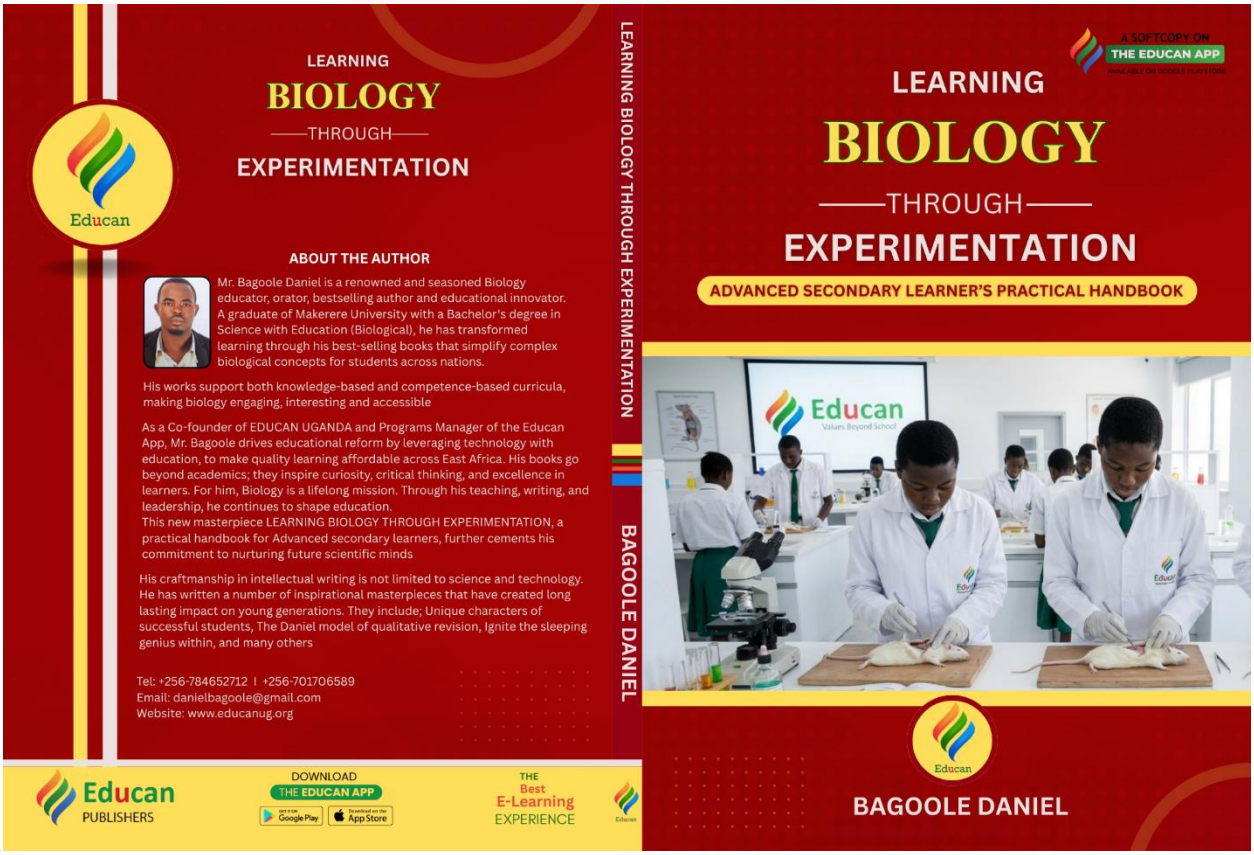
BIOLOGY P530/2

(Practical)

This is an extract from one of our unmatched masterpieces, "**Learning Biology Through Experimentation. Advanced Level Practical**", a student's practical manual. A one of kind masterpiece tailored by the best brains of Educan to ease the teaching and learning of practical Biology at advanced level. The Items are standard and drafted basing on the syllabus and practical assessment objectives. Each section consists of well organised, researched and standardised notes about that practical area, followed by some worked out items, and then a series of Practice Items with ample spaces for trial by the learner.

The masterpiece comes with a free hard copy of the teacher's preparation manual



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UNIT 1

MICROSCOPIC WORK

Unit Learning Outcomes

By the end of this section, you must be able to operate a light microscope to observe tissues from plants and animals under different magnifications

INTRODUCTION TO BASICS OF LABORATORY ANALYSIS

Cells are the basic units from which living organisms are made. Most cells are very small, and their structures can only be seen by using a microscope. You will use a light……

Investigation 02

A farmer in the Lwera Wetlands is struggling to control an invasive weed species **B**, which is choking his crops. He notices that while his crops and the weed struggle in waterlogged soil, another species **A**, thrives in the same swamp. To advise him on why weed species **B** cannot compete in the deep swamp, you are provided with leaf samples from both plants.

Task:

(a) Prepare a transverse section of the petiole of specimen **A** and examine it under medium power.

(i) Make a labelled drawing of the transverse section of the petiole of weed species **A**, as seen under medium power.

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(ii) Based on your observation, identify one tissue that is well-developed and suggest how it helps specimen **A** survive in waterlogged conditions.

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(b) Prepare epidermal peels from the upper surface of specimen **A** and specimen **B**. Observe both under medium power. Explain why specimen **A** can thrive in the swamp while Specimen **B**, though invasive, cannot tolerate prolonged waterlogging.

..... (Find more details in the complete workbook)

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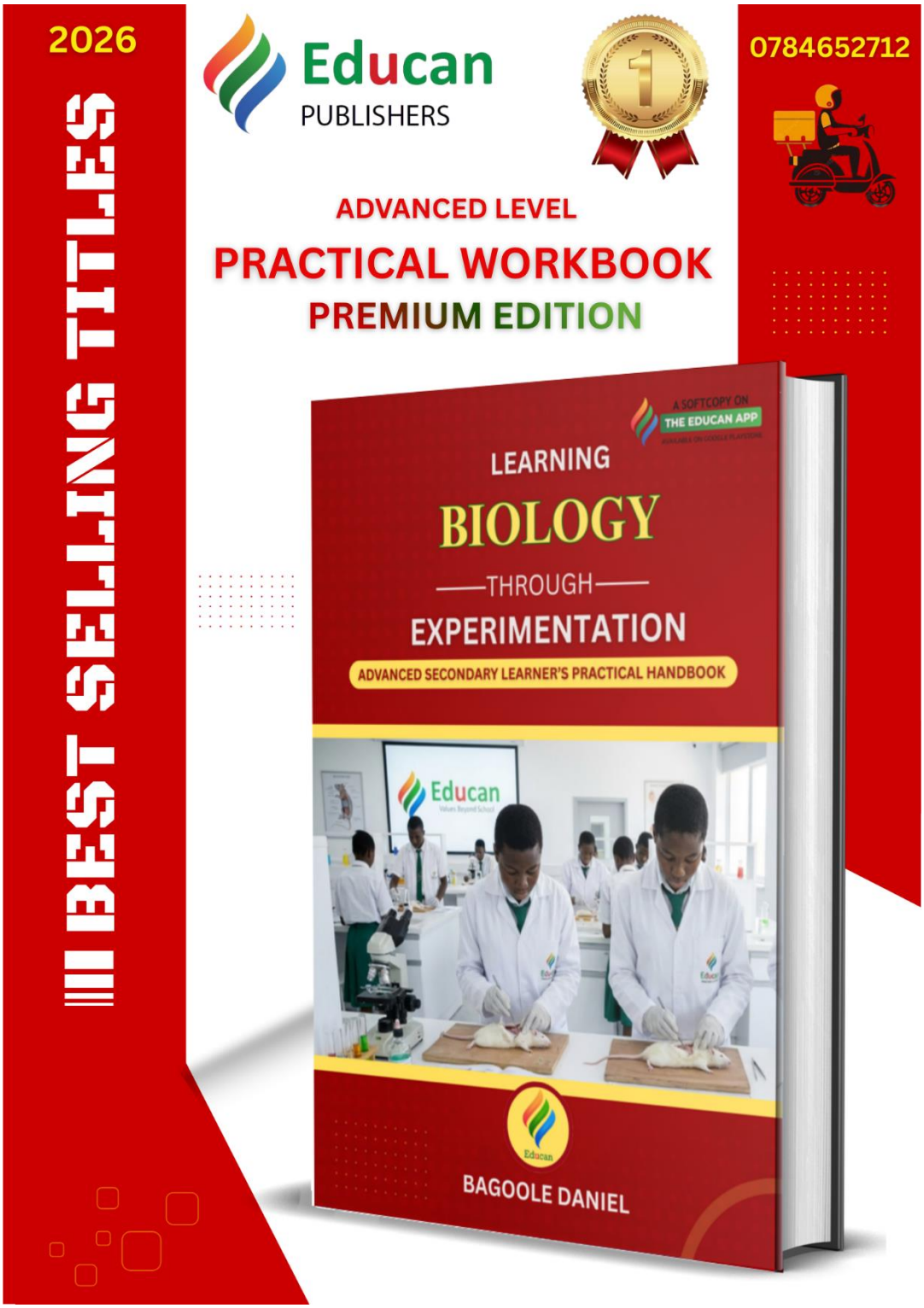

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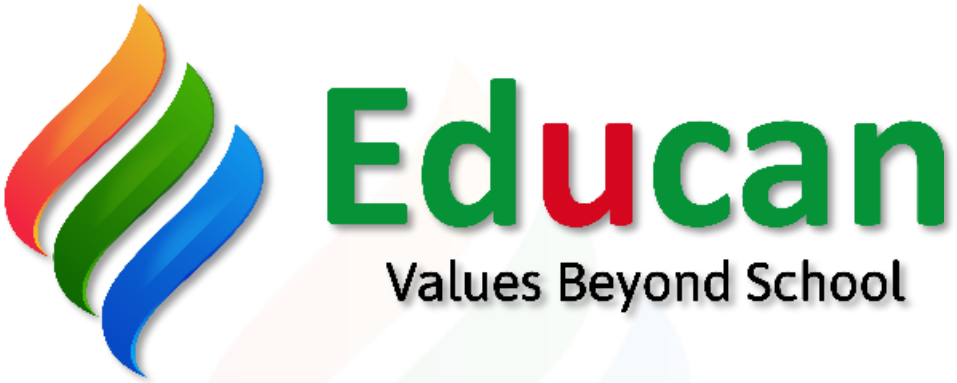

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DISCLAIMER!!

This document is drafted entirely following the guidelines from the NCDC Advanced Biology syllabus with an effort to improve learners' understanding of Biology as part and partial of our dedicated call in Nation building.

It is also intended to spark teachers' imagination, creativity, and enthusiasm to mould them into better facilitators of both advanced and ordinary level Biology

Any misinterpretation, misperception or mis-association of the document is not within the limits of the intention / objective of the authors

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