



REPUBLIC OF KENYA

**NATIONAL OCCUPATIONAL STANDARD**

**FOR**

**AGRICULTURE AND EXTENSION PRACTITIONER**

**LEVEL 6  
(CYCLE 3)**

**ISCED OCCUPATIONAL STANDARD CODE: 0811 554 A**



**TVET CDACC  
P.O. BOX 15745-00100 NAIROBI**

## APPLY GENETICS CONCEPTS

**UNIT CODE: 0811 551 9A**

**TVET CDACC UNIT CODE: AGR/OS/EXT/CC/04/6/MA**

### UNIT DESCRIPTION

This unit covers describes knowledge, skills and attitudes required to apply genetic concepts. It involves applying Mendelian and chromosomal theories in theory in agricultural production it also involves illustrating genetic mutations in agricultural production.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements.  <b><i>Bold and italicized terms are elaborated in the Range).</i></b>
1. Apply chromosomal theory	1.1 Chromosome structure is identified and illustrated based on genetic principles 1.2 DNA structure is identified and illustrated based on genetic principles 1.3 Role of DNA is illustrated based on genetic principles 1.4 <b><i>Cell division stages</i></b> are identified and illustrated based on genetic principles
2. Apply Mendelian theory	2.1 Concept of variation is applied in breeding based on genetic principles 2.2 Monohybrid inheritance is identified and illustrated based on genetic principles 2.3 Dihybrid inheritance is identified and illustrated based on genetic principles 2.4 Complete dominance is identified and illustrated based on genetic principles 2.5 Co-dominance is identified and illustrated based on genetic principles 2.6 Incomplete dominance is identified and illustrated based on genetic principles

	<p>2.7 Phenotypes and genotypes are illustrated based on genetic principles</p> <p>2.8 Phenotypic and genotypic frequencies are illustrated based on genetic principles</p>
3. Apply genetic mutation	<p>3.1 <b>Causes of mutations</b> are identified based on genetic principles</p> <p>3.2 <b>Types of mutation</b> are identified and illustrated based</p> <p>3.3 <b>Mutational disorders</b> are identified and illustrated based on genetic principles</p>

## RANGE OF VARIABLES

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

RANGE	VARIABLE
1. Cell division stages may include but not limited to:	<ul style="list-style-type: none"> <li>• Interphase</li> <li>• Prophase</li> <li>• Metaphase</li> <li>• Anaphase</li> <li>• Telophase</li> </ul>
2. Causes of mutations may include but not limited to:	<ul style="list-style-type: none"> <li>• Radioactive rays</li> <li>• Chemicals</li> <li>• Infectious agents</li> </ul>
3. Types of mutation may include but not limited to:	<ul style="list-style-type: none"> <li>• Chromosomal mutation</li> <li>• Gene mutation</li> </ul>
4. Mutational disorders may include but not limited to:	<ul style="list-style-type: none"> <li>• Hypotrichosis</li> <li>• Beta-man</li> <li>• Osteoporosis</li> <li>• Pulmonary hypoplasia</li> </ul>

## **REQUIRED KNOWLEDGE AND SKILLS**

This section describes the skills and knowledge required for this unit of competency.

### **Required knowledge**

The individual needs to demonstrate the following skills:

- Inheritance and variation
- Chromosome structures
- Structure of DNA
- Role of DNA
- Causes of mutation
- Cell division
- Types of mutation
- Mutational disorders

### **Required skills**

The individual needs to demonstrate knowledge of:

- Critical thinking
- Logical thinking
- Problem Solving
- Drawing
- Interpretation
- Application
- Communication

## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical aspects of competency	Assessment requires evidence that the candidate: Concept of variation is applied in animal breeding based on genetic principles 1.1 Identified and illustrated Monohybrid inheritance 1.2 Identified and illustrated Dihybrid inheritance 1.3 Identified and illustrated Complete dominance 1.4 Identified and illustrated Co-dominance 1.5 Identified and illustrated Incomplete dominance 1.6 Identified and illustrated Chromosome structure 1.7 Identified and illustrated DNA structure 1.8 Role of DNA is illustrated based on genetic principles 1.9 Identified and illustrated Cell division 1.10 Identified Causes of mutations 1.11 Types of mutation are identified and illustrated 1.12 Identified and illustrated Mutational disorders
2. Resource implication	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant workplace assessment environment 2.3 Resources relevant to the proposed assessment activity or tasks
3. Method of assessment	Competency in this unit may be assessed through: 2.1 Practical 2.2 Written tests 2.3 Questionnaires 2.4 Oral questioning
4. Context of assessment	Competency may be assessed: 4.1 Workplace 4.2 Simulated work environment
5. Guidance	Holistic assessment with other units relevant to the industry sector,

information for assessment	workplace and job role is recommended.
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