



**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 INORGANIC AND ORGANIC CHEMISTRY PRINCIPLES

**UNIT CODE: 0531 551 7A**

**TVET CDACC UNIT CODE:** AGR/OS/EXT/CC/02/6/MA

### UNIT DESCRIPTION

This unit specifies the competencies required by agriculture and extension practitioner to apply inorganic and organic chemistry. It involves applying physical chemistry principles, inorganic and organic chemistry concepts.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the <b>key outcomes</b> which makeup <b>work place function</b> .	<b>PERFORMANCE CRITERIA</b> These are <b>assessable</b> statements which specify the required level of performance for each of the elements. <i>(Bold and italicized terms are elaborated in the range).</i>
1. Apply physical chemistry principles	1.2 Acid and bases properties are applied as per acid-base theory. 1.3 Salts properties are applied as per salt solubility rules 1.4 Ionic and chemical equilibrium properties are applied as per physical chemistry theory. 1.5 Reaction kinetics properties are applied as per physical chemistry theory. 1.6 Gas properties are applied as per kinetic theory of gases.
2. Apply inorganic chemistry concepts	2.1 Knowledge of element is applied as per the periodic table. 2.2 <b>Chemical bonds</b> are determined according to Valence Shell Electron Pair Repulsion (VSEPR) theory. 2.3 Inorganic salts are tested as per solubility rules
3. Apply organic chemistry concepts	3.1 <b>Organic compounds classes</b> are used according to International Union of Pure and Applied Chemistry (IUPAC) rules. 3.2 <b>Physical properties</b> of organic compounds are applied as per IUPAC rules. 3.3 <b>Chemical properties</b> organic compounds are applied as per IUPAC rules. 3.4 Synthesized compounds are purified as per organic

	laboratory manual
	3.5 Purified compounds are used as per organic laboratory manual

## RANGE

This section provides work environment and conditions to which the performance criteria apply.

It allows for different work environment and situations that will affect performance.

Variable	Range
1. Chemical bonds may include but are not limited to:	<ul style="list-style-type: none"> <li>• Ionic bonds</li> <li>• Covalent bonds</li> <li>• Metallic bonds</li> <li>• Hydrogen bonds</li> </ul>
2. Organic compounds classes may include but are not limited to:	<ul style="list-style-type: none"> <li>• Carbohydrates</li> <li>• Proteins</li> <li>• Lipids</li> <li>• Hydrocarbons</li> </ul>
3. Physical properties may include but are not limited to:	<ul style="list-style-type: none"> <li>• Colour</li> <li>• Hardness</li> <li>• Mass</li> <li>• Solubility</li> <li>• Density</li> <li>• Melting point</li> </ul>
4. Chemical properties may include but are not limited to:	<ul style="list-style-type: none"> <li>• pH</li> <li>• Chemical stability</li> <li>• Radioactivity</li> <li>• Flammability</li> <li>• Heat of combustion</li> </ul>

## REQUIRED KNOWLEDGE AND SKILLS

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

Required knowledge

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The individual needs to demonstrate knowledge of:

- Periodic table
- Hydrocarbons
- Chemical reaction
- Laboratory safety
- Laboratory apparatus
- Laboratory rules and regulation

### **Required skills**

The individual needs to demonstrate the following skills:

- Observation
- Analytical
- Critical thinking
- Writing
- Active listening
- Problem solving

### **EVIDENCE GUIDE**

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

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Applied acid and bases properties as per acid-base theory. 1.2 1.3 Applied salts properties as per salt solubility rules 1.4 Applied Ionic and chemical equilibrium properties as per physical chemistry theory. 1.5 Applied reaction kinetics properties as per physical chemistry theory. 1.6 Applied gas properties as per kinetic theory of gases. 1.7 Tested inorganic salts as per solubility rules 1.8 Applied physical properties of organic compounds as per IUPAC rules. 1.9 Applied chemical properties organic compounds as per IUPAC rules.
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	1.10 Used purified compounds as per organic laboratory manual
2. Resource implications	<p>The following resources should be provided:</p> <p>2.1 Appropriately simulated environment where assessment can take place</p> <p>2.2 Access to relevant work environment</p> <p>2.3 Resources relevant to the proposed activities or tasks</p>
3. Methods of assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Practical</p> <p>3.2 Oral questioning</p> <p>3.3 Portfolio of evidence</p> <p>3.4 Third party report</p> <p>3.5 Written tests</p>
4. Context of assessment	<p>Competency may be assessed:</p> <p>4.1 Workplace</p> <p>4.2 Simulated work environment</p>
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector and workplace job role is recommended.