

## **GENERAL SCIENCE SKILLS**

**UNIT CODE: 0588 441 03A**

**TVET CDACC UNIT CODE: SLT/CU/SL/CC/01/5/MA**

**UNIT DURATION:** 80 Hours

### **Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply general science principles

### **Unit Description**

This unit covers the competencies required to apply general science principles. It involves applying animal anatomy and physiology concepts, plant anatomy and physiology concepts, inorganic chemistry concepts, organic chemistry concepts, physical chemistry concepts, mechanics concepts and thermodynamics concepts.

### **Summary of learning outcomes**

By the end of this unit, the learner should be able to:

<b>S/No</b>	<b>Learning Outcomes</b>	<b>Duration (Hours)</b>
1.	Apply animal anatomy and physiology concepts	20
2.	Apply plant anatomy and physiology concepts	20
3.	Apply inorganic chemistry concepts	10
4	Apply organic chemistry concepts	10
5	Apply physical chemistry concepts	10
6	Apply mechanics concept	10
	<b>Total</b>	<b>80</b>

### **Learning Outcomes, Content and Suggested Assessment Methods**

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>

<p>1. Apply animal anatomy and physiology concepts</p>	<p>1.1 Animal nutrition</p> <p>1.1.1 Parasitism</p> <p>1.1.2 Symbiosis</p> <p>1.1.3 Saprophytism</p> <p>1.1.4 Holozoic nutrition</p> <p>1.2 Animal transport system</p> <p>1.2.1 Types of circulation</p> <p>1.2.2 Components of the human circulatory system</p> <p>1.3 Animal reproduction</p> <p>1.3.1 Organs of the human reproductive system</p> <p>1.4 Animal excretory system</p> <p>1.4.1 Organs of the human excretory system</p> <p>1.4.2 Animal gaseous exchange system</p> <p>1.5 Organs of gaseous exchange in an insect</p>	<ul style="list-style-type: none"> <li>• Practical tests</li> <li>• Written tests</li> <li>• Observation</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>
<p>2. Apply plant anatomy and physiology concepts</p>	<p>2.1 Plant nutrition</p> <p>2.1.1 Autotropism- process of photosynthesis</p> <p>2.2 plant transport system</p> <p>2.2.1 structure of xylem tissues</p> <p>2.2.2 structure of phloem tissue</p> <p>2.3 Plant reproduction</p> <p>2.3.1 Sexual reproduction</p> <p>2.3.2 Asexual reproduction</p> <p>2.4 Plant excretory system</p> <p>2.4.1 Plant excretory products</p> <p>2.5 Economic importance of plant excretory products</p> <p>2.6 Plant gaseous exchange system</p>	<ul style="list-style-type: none"> <li>• Practical tests</li> <li>• Written tests</li> <li>• Observation</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>

	2.6.1 Mechanism of opening and closing of stomata	
3. Apply mechanics concept	3.1 Friction 3.1.1 Definition 3.1.2 Applications 3.2 Newton's Law of Motion 3.2.1 Circular motion 3.2.2 Angular displacement 3.2.3 Angular velocity 3.2.4 Angular acceleration 3.2.5 Tension 3.2.6 Definition 3.2.7 Applications 3.3 Shear 3.4 Bulk modulus	<ul style="list-style-type: none"> <li>• Practical tests</li> <li>• Written tests</li> <li>• Observation</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>
4. Apply thermodynamics concepts	4.1 Modes of heat transfer 4.1.1 Conduction 4.1.2 Convection 4.1.3 Radiation 4.2 Thermodynamic laws 4.2.1 First law of thermodynamics 4.2.2 Second law of thermodynamics 4.3 Work, energy and power 4.4 Definition 4.5 Application	<ul style="list-style-type: none"> <li>• Practical tests</li> <li>• Written tests</li> <li>• Observation</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>
5. Apply inorganic chemistry concepts	5.1 Apply Elements classification knowledge 5.1.1 S- block elements 5.1.2 P-block elements 5.1.3 D- block elements 5.2 Model Chemical bonds 5.3 Ionic bond 5.4 Covalent bond 5.5 Metallic bond 5.6 Dative bond 5.7 Hydrogen bonding	<ul style="list-style-type: none"> <li>• Practical tests</li> <li>• Written tests</li> <li>• Observation</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>

	<b>5.8 Prepare Inorganic salt</b>	
6. Apply organic chemistry concepts	<p>6.1 Apply Organic compound classification knowledge</p> <p>6.1.2 Ionic bond</p> <p>6.1.3 Covalent bond</p> <p>6.1.4 Metallic bond</p> <p>6.1.5 Dative bond</p> <p>6.1.6 Hydrogen bonding</p> <p>6.2 Model Organic compound</p> <p>6.3 Apply Organic reaction concept</p> <p>6.3.1 Ionic bond</p> <p>6.3.2 Covalent bond</p> <p>6.3.3 Metallic bond</p> <p>6.3.4 Dative bond</p> <p>6.4 Hydrogen bonding</p>	<ul style="list-style-type: none"> <li>● Practical tests</li> <li>● Written tests</li> <li>● Observation</li> <li>● Portfolio of evidence</li> <li>● Third party report</li> </ul>
7. Apply physical chemistry concepts	<p>7.1 Identify Acids and bases</p> <p>7.2 Acids</p> <p>7.2.1 Hydrochloric acid</p> <p>7.2.2 Sulphuric (VI) acid</p> <p>7.2.3 Nitric (V) acid</p> <p>7.3 Bases</p> <p>7.3.1 Sodium hydroxide</p> <p>7.3.2 Ammonia solution</p> <p>7.3.3 Calcium hydroxide</p> <p>7.4 Apply Gas law concept</p> <p>7.4.1 Boyle's Law</p> <p>7.4.2 Charle's Law</p> <p>7.4.3 Dalton's Law of partial pressures</p> <p>7.4.4 Graham's Law of diffusion</p> <p>7.5 Apply Electrochemistry concept.</p> <p>7.5.1 Reduction</p> <p>7.5.2 Oxidation</p> <p>7.5.3 Electrolysis</p> <p>7.5.4 Faraday's Laws 1 and 2</p> <p>7.6 Electrolytes</p>	<ul style="list-style-type: none"> <li>● Practical tests</li> <li>● Written tests</li> <li>● Observation</li> <li>● Portfolio of evidence</li> <li>● Third party report</li> </ul>

## Suggested Methods of Instruction

- Demonstration
- Viewing of related videos
- Discussion
- Direct Instruction
- Field study

## Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A Learning Materials</b>				
1.	Desktop computer/laptop	For trainer's use	1	1:25
2.	Internet connection	Wi-Fi		1:25
3.	Projector		1	1:25
4.	Whiteboard	4 x 8 ft	1	1:25
5.	Assorted colour of whiteboard markers	Red, blue and black	3	1:25
1.	thermometers	Liquid in glass thermometer	25	1:1
2.	stopwatches	Digital	25	1:1
3.	weighing balances	Electronic balance (0-2kg)	5	1:5
4.	calorimeters	Copper calorimeters	25	1:1
5.	Solid block	wooden	25	1:1
6.	Ball bearing	One packet	25	1:1
7.	Rollers	One packet	25	1:1
8.	Spring	2N/cm	25	1:1
9.	Rubber band	Standard	25	1:1
10.	Portable burner	300g	25	1:1
11.	Source of water	Taps/sinks	10	2:5
12.	Electric sockets	Single sockets	10	2:5
13.	pulley	single		1:1

14.	Inclined plain	$45^0$		1:25
<b>B</b>	<b>Learning Facilities &amp; infrastructure</b>			
1	standard Science laboratory		1	1:25
2	Ovens	For trainer's and trainee use	1	1:25
3	Furnace	For trainer's and trainee use	1	1:25
4	Colorimeter	For trainer's and trainee use	1	1:25
5	Flame emission spectrophotometer	For trainer's and trainee use	1	1:25
6	Furnace	For trainer's and trainee use	1	1:25
7	Analytical Balance	For trainer's and trainee use	5	1:5
8	Soxhlet extractor	For trainer's and trainee use	4	1:8
9	Khjedhal Apparatus	For trainer's and trainee use	3	1:8
10	Microscopes	For trainer's and trainee use	5	1:5

© 2025, TVET CDACC