Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

FORPB302

BASIC KNOWLEDGE ON PLANT BIOLOGY

Demonstrate basic knowledge on plant biology

Competence

RQF Level: 3

Learning Hours: 30

Credits: 3

Sector: Agriculture and Food processing

Trade: Forestry

Module Type: General

Curriculum: AFPFOR3002 - TVET Certificate 3 in Forestry

Issue Date: June, 2022

Purpose statement	This module describes the skills and knowledge required to apply the knowledge of plant biology. It is designed for learners who have successfully completed 9 years' basic education or its equivalent and pursuing Level III in forestry. At the end of this module, Leaners will be able to describe the mechanisms of plant reproduction, germination, growth, and development as basis of crop production, plant laboratory analysis, plant pest and disease control and other related modules.					
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%	Formative assessment	30%	100%
	Practical work:		70%		70%	
	• Group project and presentation	20%				
	• Individual project /Work	50%				
			Summative Assessment			

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Describe germination mechanisms	1.1. Seeds characteristics are properly identified
	1.2. Germination types are properly identified
	1.3. Germination factors are adequately differentiated
	1.4. Germination test is well performed
2. Describe plant growth and development	2.1. Plant groups are adequately categorized
	2.2. Major parts of plant are adequate differentiated
	2.3. Growth and development factors are adequate differentiated
	2.4. Plant nutrient uptake and water movement are properly described
	2.5. Photosynthesis in plant properly described
3. Describe plant reproduction	3.1. Reproductive organs are appropriately differentiated
	3.2. reproduction modes are properly differentiated
	3.3. Pollinating agents are adequate differentiated.

Course content

Learning outcomes	At the end of the module the learner will be able to: 1. Describe germination mechanisms 2. Describe plant growth and development 3. Describe plant reproduction
Learning outcome 1: Describe germination mechanisms	**Learning hours: 10**

Indicative content

- **Differentiate seeds characteristics**
  - ✓ Types of seeds
  - ✓ Parts of seeds
  - ✓ Seed quality
  - ✓ Seed classification
- **Identify germination types and its factors**
  - ✓ Types of germination
  - ✓ Hypogeal germination
  - ✓ Epigeal germination
  - ✓ Factors affecting seed germination
- **Perform seed germination test**
  - ✓ Methods used to conduct germination tests
  - Using paper, Using sand

Resources required for the learning outcome

Equipment	- Computer, Projector, PPE
Materials	- Markers, Flipchart, Seeds, Audio visual media, Substrate (soil, sand, sawdust, ash), Organic mulch, Audio visual media, Markers, Flip chart, Gumboots, Overall, Overcoats, Gloves, Masks
Tools	- Photos, Seeding Hoe, Watering can.
Facilitation techniques	• Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion
Formative assessment methods	• Written assessment, Oral presentation, Performance assessment, Product based assessment, Project based assessment

Learning outcome 2: Describe plant growth and development	**Learning hours: 10**

Indicative content

- **Categorize plant groups**

✓ Plant categories:

- Cereals, Legumes, Vegetable, Roots and tuber

- **Differentiate major parts of plant**

✓ Types of plants parts:

- Types of Roots, Types of Stems, Types of Fruits, Types of leaves, Types of flowers

- **Differentiate growth and development factors**

✓ Definition of plant growth

✓ Plant growth factors

- The effect of light (photoperiodism and phototropism), Soil aeration and soil structure, Soil reaction, Supply of mineral nutrient, Plant hormones, (Auxin, Gibberellins, Cytokinins, Etylene, Abscisic acid), Crop variety

- **Describe plant nutrient uptake and water movement.**

✓ **Phenomena of water transport:**

- Osmosis, Diffusion

✓ **Water movement in plant**

- Absorption by roots, Transport through xylem, Movement in the Phloem

✓ **Plant nutrient uptake**

- Root interception, Mass flow, diffusion

✓ Factors influencing nutrient uptake:

- Soil, Roots, Microbes

- **Describe photosynthesis in plant.**

✓ Plant cell structure

✓ Definition of photosynthesis

✓ Factors influencing the rate of photosynthesis

Resources required for the indicative content

Equipment	- Computer, Projector
Materials	- Internet, Plants, Markers, Flipchart, Glass, Different containers, Seeds, Seedling, Glass, Different containers, Markers, Flipchart
Tools	- Reference books, Photos, Audio visual media
Facilitation techniques	• Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion
Formative assessment methods	• Written assessment, Oral presentation, Performance assessment, Product based assessment

Learning outcome 3: Describe plant reproduction	**Learning hours: 10**

Indicative content

- **Differentiate reproductive organs**

✓ Reproduction organs:

- Flower, Fruits, Buds or segment, Seeds

- **Differentiate reproduction modes**
  - ✓ **Types of plant reproduction modes:**
    - Sexual reproduction, sexual reproduction
- **Differentiate pollinating agents.**
  - ✓ **Types of plant pollination agents:**
    - Biotic (insect, animal, birds), Abiotic (wind and water)

Resources required for the indicative content	
Equipment	Computer, Projector, PPE
Materials	Internet, Markers, Flipchart, Plants, Knives, Plant
Tools	Reference books, Audio visual media, Photos
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized ,Trainer guided ,Group discussion
Formative assessment methods	Written assessment, Oral presentation, Performance assessment Product based assessment

References:

1. Woodland DW (1991) Contemporary plant systematics. Prentice Hall, Englewood Cliff
2. Krishnamurthy KV (2006) The Tamils and plants (in Tamil). Bharathidasan University, Tiruchirappalli
3. Krishnamurthy KV (2010) Origin and evolution of plants a brief review. J Swamy Bot Cl 27:1–12
4. Krishnamurthy KV (2015) Growth and development in plants. Scientific Publishers, Jodhpur