



REPUBLIC OF KENYA

COMPETENCY BASED CURRICULUM

FOR

APIARY ATTENDANCE

LEVEL 4



TVET CDACC
P.O. BOX 15745-00100
NAIROBI

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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Apiculture Sector's growth and development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION**

PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Apiculture Sector Skills Advisory Committee (SSAC) and Ministry of livestock have developed this curriculum.

This curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Apiculture SSAC, expert workers and all those who participated in the development of this curriculum.

**Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. EngTech.
CHAIRMAN, TVET CDACC**

ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support was received from various organizations.

I recognize with appreciation the role of the Apiculture Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Apiculture sector for their valuable input and all those who participated in the process of developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that workers in Apiculture Sector acquire competencies that will enable them to perform their work more efficiently.

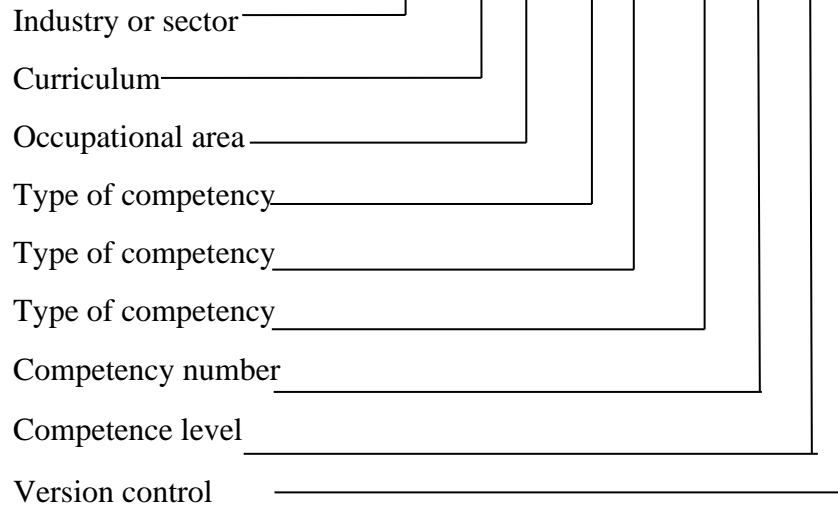
Dr. LAWRENCE GUANTAI M'ITONGA, PhD
COUNCIL SECRETARY/CEO
TVET CDACC

ACRONYMS

CDACC	: Curriculum Development Assessment and Certification Council
CU	: Curriculum
BC	: Basic Competency
CC	: Core Competency
CO	: Common Units
KCSE	: Kenya Certificate of Secondary Education
KNQA	: Kenya National Qualifications Authority
OSHA	: Occupation Safety and Health Act
PPE	: Personal Protective Equipment
SSAC	: Sector Skills Advisory Committee
TVET	: Technical and Vocational Education and Training

KEY TO UNIT CODE

AGR / CU / API / BC / CO / CC / 01 / 4 / A



COURSE OVERVIEW

The Apiary Attendance Level Four (4) qualification consists of competencies that a person must achieve to demonstrate bee biology and behaviour, establish an apiary, manage bee forage resources, manage honey bee swarms, manage honey bee colony, control honey bee pests and diseases and harvest bee products within the institution's/organizations acceptable standard operating procedures (SOPs).

Units of Learning

This course consists of basic and core units of learning as indicated below:

Basic Units of Learning

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit factor
AGR/CU/API/BC/01/4/A	Communication skills	20	2
AGR/CU/API/BC/02/4/A	Numeracy skills	25	2.5
AGR/CU/API/BC/03/4/A	Digital literacy	35	3.5
AGR/CU/API/BC/04/4/A	Entrepreneurial skills	60	6
AGR/CU/API/BC/05/4/A	Employability skills	30	3
AGR/CU/API/BC/06/4/A	Environmental literacy	20	2
AGR/CU/API/BC/07/4/A	Occupational safety and health practices	20	2
Total		210	21

Core units of learning

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit factor
AGR/CU/API/CR/01/4/A	Bee biology and behaviour	30	3
AGR/CU/API/CR/02/4/A	Apiary establishment	50	5
AGR/CU/API/CR/03/4/A	Bee forage resources management	40	4
AGR/CU/API/CR/04/4/A	Honey bee swarm's management	60	6
AGR/CU/API/CR/05/4/A	Honey bee colony management	60	6
AGR/CU/API/CR/06/4/A	Honey bee pests and disease control	70	7

AGR/CU/API/CR/07/4/A	Bee products harvesting	30	3
	Industrial attachment	300	30
Total		640	64
Grand Total		850	85

The total duration of the course is 850 hours.

Entry Requirements

An individual entering this course should have any of the following minimum requirements:

a) Apiculture certificate Level 3

Or

b) Kenya Certificate of Secondary Education (KCSE) E

Or

c) Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)

Assessment

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an accredited internal verifier while external assessment is the responsibility of TVET CDACC.

Certification

A candidate will be issued with a Certificate of Competency for each Unit of Competency. To attain the qualification National certificate Level 4 Apiary attendance, the candidate must demonstrate competence in all the units of competency as given in qualification pack. These certificates will be issued by TVET CDACC in conjunction with training provider

BASIC UNITS OF LEARNING

COMMUNICATION SKILLS

UNIT CODE: AGR/CU/API/BC/01/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate communication skills

Duration of Unit: 20 Hours

Unit Description

This unit describes the competencies required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

Summary of Learning Outcomes

1. Obtain and convey workplace information
2. Complete relevant work-related documents
3. Communicate information about workplace processes
4. Lead workplace discussion
5. Identify and communicate issues arising in the workplace

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Obtain and convey workplace information	<ul style="list-style-type: none">• Communication process• Modes of communication• Medium of communication• Effective communication• Barriers to communication• Flow of communication• Sources of information• Types of questions• Organizational policies• Workplace etiquette• Ethical work practices in handling communication	<ul style="list-style-type: none">• Observation• Interview• Third party reports
2. Complete relevant work-related documents	<ul style="list-style-type: none">• Types and purposes of workplace documents and forms• Methods used in filling forms and documents• Recording workplace data	<ul style="list-style-type: none">• Observation• Interview• Third party reports

	<ul style="list-style-type: none"> • Process of distributing workplace forms and documents • Report writing • Types of workplace reports 	
3. Communicate information about workplace processes	<ul style="list-style-type: none"> • Communication process • Modes of communication • Medium of communication • Effective communication • Barriers to communication • Flow of communication • Sources of information • Organizational policies • Organization requirements for written and electronic communication methods • Report writing • Effective questioning techniques (clarifying and probing) • Workplace etiquette • Ethical work practices in handling communication 	<ul style="list-style-type: none"> • Observation • Interview • Portfolio
4. Lead workplace discussion	<ul style="list-style-type: none"> • Methods of discussion e.g. <ul style="list-style-type: none"> ✓ Coordination meetings ✓ Toolbox discussion ✓ Peer-to-peer discussion • Solicitation of response 	<ul style="list-style-type: none"> • Observation • Interview • Third party reports
5. Identify and communicate issues arising in the workplace	<ul style="list-style-type: none"> • Identification of problems and issues • Organizing information on problems and issues • Relating problems and issues • Communication barriers affecting workplace discussions 	<ul style="list-style-type: none"> • Observation • Interview • Portfolio

Suggested Delivery Methods

- Discussion

- Role play
- Brainstorming

Recommended Resources

- Desktop computers/laptops
- Internet connection
- Projectors
- Telephone
- Report writing templates

NUMERACY SKILLS

UNIT CODE: AGR/CU/API/BC/02/4/A

Relationship to Occupational Standards:

This unit addresses the unit of competency: Demonstrate numeracy skills

Duration of Unit: 25 hours

Unit Description

This unit describes the competencies required by a worker in order to competently Identify and use whole numbers and simple fractions, decimals and percentages; Identify, measure and estimate familiar quantities for work, Read and use familiar maps, plans and diagrams for work, Identify and describe common 2D and some 3D shapes for work, Construct simple tables and graphs for work using familiar data, Identify and interpret information in familiar tables, graphs and charts for work.

Summary of Learning Outcomes

1. Identify and use whole numbers and simple fractions, decimals and percentages for work
2. Identify, measure and estimate familiar quantities for work
3. Read and use familiar maps, plans and diagrams for work
4. Identify and describe common 2D and some 3D shapes for work
5. Construct simple tables and graphs for work using familiar data
6. Identify and interpret information in familiar tables, graphs and charts for work

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify and use whole numbers and simple fractions, decimals and percentages for work	<ul style="list-style-type: none">• Whole numbers• Simple fractions• Decimals• Percentages• Sizes• Problem solving methods• calculations using the 4 operations• Recording and communicating numerical information	<ul style="list-style-type: none">• Oral• Written• Practical test• Observation

<p>2. Identify, measure and estimate familiar quantities for work</p>	<ul style="list-style-type: none"> • Measurement information • Units of measurement • Estimate familiar and simple amounts • Selection of appropriate measuring equipment • Calculate using familiar units of measurement • Check measurements and results against estimates • Using informal and some formal mathematical and general language • Record or report results 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation
<p>3. Read and use familiar maps, plans and diagrams for work</p>	<ul style="list-style-type: none"> • Maps, plans and diagrams • Locate items and places in familiar maps, plans and diagrams • Recognize common symbols and keys in familiar maps, plans and diagrams • Direction and location of objects, or route or places • Use of informal and some formal oral mathematical language and symbols 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation
<p>4. Identify and describe common 2D and some 3D shapes for work</p>	<ul style="list-style-type: none"> • Common 2D shapes and 3D shapes • Classification of common 2D shapes and designs • Description of Use informal and some formal language to describe common two-dimensional shapes and some common three-dimensional shapes • Construction of common 2D shapes • Match common 3D shapes to their 2D sketches or nets 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation

<p>5. Construct simple tables and graphs for work using familiar data</p>	<ul style="list-style-type: none"> • Types of graphs • Determination of data to be collected • Selection of data collection method • Collection of data • Determination of variables from the data collected • Order and collate data • Construct a table and enter data • Construct a graph using data from table • Check results • Report or discuss graph information related to work using informal and some formal mathematical and general language 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation
<p>6. Identify and interpret information in familiar tables, graphs and charts for work</p>	<ul style="list-style-type: none"> • Tables construction and labeling • i.e. title, headings, rows and columns • Interpreting information and data in simple tables • Relaying information of relevant workplace tasks on/in a table • Identify familiar graphs and charts in familiar texts and contexts • Locate title, labels, axes, scale and key from familiar graphs and charts • Identify and interpret information and data in familiar graphs and charts • Relate information to relevant workplace tasks 	<ul style="list-style-type: none"> • Oral • Written • Practical test • Observation

Suggested Delivery Methods

- Instructor led facilitation of theory

- Practical demonstration of tasks by trainer
- Practice by trainees/ role play
- Discussion
- Observations and comments and corrections by trainers

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Mathematical tables

DIGITAL LITERACY

UNIT CODE:AGR/CU/API/BC/03/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate digital literacy

Duration of Unit: 35 hours

Unit Description

This unit covers the competencies required to effectively demonstrate digital literacy in a working environment. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop PCs for purposes of communication and performing work related tasks at the work place.

Summary of Learning Outcomes

1. Identify computer hardware and software
2. Apply security measures to data, hardware and software
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify computer hardware and software	<ul style="list-style-type: none"> • Meaning of a computer • Functions of a computer • Components of a computer • Classification of computers 	<ul style="list-style-type: none"> • Written • Oral • Observation

2. Apply security measures to data, hardware and software	<ul style="list-style-type: none"> • Data security and control • Security threats and control measures • Types of computer crimes • Detection and protection against computer crimes 	<ul style="list-style-type: none"> • Written tests • Oral presentation • Observation • Projects
3. Apply computer software in solving tasks	<ul style="list-style-type: none"> • Operating system • Word processing • Spread sheets • Data base 	<ul style="list-style-type: none"> • Oral questioning • Observation • Project
4. Apply internet and email in communication at workplace	<ul style="list-style-type: none"> • Computer networks • Uses of internet • Electronic mail (e-mail) concept 	<ul style="list-style-type: none"> • Oral questioning • Observation • Oral presentation • Written report

Suggested Delivery Methods

- Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Project
- Group discussions

Recommended Resources

- Desk top computers
- Laptop computers
- Other digital devices
- Printers
- Storage devices
- Internet access
- Computer software

ENTREPRENEURIAL SKILLS

UNIT CODE: AGR/CU/API/BC/04/4/A

Relationship to occupational standards

This unit addresses the unit of competency: Demonstrate entrepreneurial skills

Duration of unit: 60 hours

Unit description

This unit describes the competencies critical to demonstration of entrepreneurial skills. It includes creating and maintaining small scale business, establishing small scale business customer base, managing and growing a small business.

Summary of Learning Outcomes

1. Create and maintain small scale business
2. Establish small scale business customer base
3. Manage small scale business
4. Grow/ expand small scale business

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Create and maintain small scale business	<ul style="list-style-type: none">• Starting a small business• Legal regulatory requirements in starting a small business• SWOT/ PESTEL analysis• Conducting market/industry survey• Generation and evaluation of business ideas• Matching competencies with business opportunities• Forms of business ownership• Location of a small business• Legal and regulatory requirement	<ul style="list-style-type: none">• Observation• Case studies• Individual/group assignments• projects• Written• Oral

	<ul style="list-style-type: none"> • Resources required to start a small business • Common terminologies in entrepreneurship • Entrepreneurship in national development • Self-employment • Formal and informal employment • Entrepreneurial culture • Myths associated with entrepreneurship • Types, characteristics, qualities & role of entrepreneurs • History, development and importance of entrepreneurship • Theories of entrepreneurship • Quality assurance for small businesses • Policies and procedures on occupational safety and health and environmental concerns 	
<p>2. Establish small scale business customer base</p>	<ul style="list-style-type: none"> • Good staff/workers and customer relations • Marketing strategy • Identifying and maintain new customers and markets • Product/ service promotions • Products / services diversification • SWOT / PESTEL analysis • Conducting a business survey • Generating Business ideas 	<ul style="list-style-type: none"> • Observation • Case studies • Individual/group assignments • projects • Written • Oral

	<ul style="list-style-type: none"> • Business opportunities 	
3. Manage small scale business	<ul style="list-style-type: none"> • Organization of a small business • Small business' business plan • Marketing for small businesses • Managing finances for small business • Production/ operation process for goods/services • Small business records management • Book keeping and auditing for small businesses • Business support services • Small business resources mobilization and utilization • Basic business social responsibility • Management of small business • Word processing concepts in small business management • Computer application software • Monitoring and controlling business operations 	<ul style="list-style-type: none"> • Oral • Observation • Case studies • Individual/group assignments • projects • Written
4. Grow/expand small scale business	<ul style="list-style-type: none"> • Methods of growing small business • Resources for growing small business • Small business growth plan • Computer software in business development 	<ul style="list-style-type: none"> • Observation • Case studies • Individual/group assignments • projects • Written

	<ul style="list-style-type: none">• ICT and business growth	
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Suggested Delivery Methods

- Instructor led facilitation of theory
- Demonstration by trainer
- Practice by trainee
- Role play
- Case study

Recommended Resources

- Case studies for small businesses
- Business plan templates
- Lap top/ desk top computer
- Internet
- Telephone
- Writing materials

EMPLOYABILITY SKILLS

UNIT CODE: AGR/CU/API/BC/05/4/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Demonstrate employability skills

Duration of Unit: 30 hours

Unit Description

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics.

Summary of Learning Outcomes

1. Conduct self-management
2. Demonstrate critical safe work habits
3. Demonstrate workplace learning
4. Demonstrate workplace ethics

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct self-management	<ul style="list-style-type: none">• Self-awareness• Formulating personal vision, mission and goals• Strategies for overcoming life challenges• Emotional intelligence• Assertiveness• Expressing personal thoughts, feelings and beliefs• Developing and maintaining high self-esteem• Developing and maintaining positive self-image• Articulating ideas and aspirations• Accountability and responsibility• Good work habits• Self-awareness• Self-development• Financial literacy	<ul style="list-style-type: none">• Observation• Written• Oral interview• Third party report

	<ul style="list-style-type: none"> • Healthy lifestyle practices 	
2. Demonstrate critical safe work habits	<ul style="list-style-type: none"> • Stress and stress management • Punctuality and time consciousness • Interpersonal communication • Sharing information • Leisure • Integrating personal objectives into organizational objectives • Resources utilization • Setting work priorities • HIV and AIDS • Drug and substance abuse • Handling emerging issues 	<ul style="list-style-type: none"> • Observation • Written • Oral interview • Third party report
3. Demonstrate workplace learning	<ul style="list-style-type: none"> • Personal training needs identification and assessment • Managing own learning • Contributing to the learning community at the workplace • Cultural aspects of work • Variety of learning context • Application of learning • Safe use of technology • Identifying opportunities • Workplace innovation • Performance improvement • Handling emerging issues • Future trends and concerns in learning 	<ul style="list-style-type: none"> • Observation • Oral interview • Written • Third party report
4. Demonstrate workplace ethics	<ul style="list-style-type: none"> • Meaning of ethics • Ethical perspectives • Principles of ethics • Values and beliefs • Ethical standards • Organization code of ethics • Common ethical dilemmas • Organization culture 	<ul style="list-style-type: none"> • Observation • Oral interview • Written • Third party report

	<ul style="list-style-type: none"> • Corruption, bribery and conflict of interest • Privacy and data protection • Diversity, harassment and mutual respect • Financial responsibility/accountability • Etiquette • Personal and professional integrity • Commitment to jurisdictional laws • Emerging issues in ethics 	
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Suggested Methods of Delivery

- Instructor lead facilitation of theory
- Demonstrations
- Simulation/Role play
- Group Discussion
- Presentations
- Projects
- Case studies
- Assignments

Recommended Resources

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

ENVIRONMENTAL LITERACY

UNIT CODE: AGR/CU/API/BC/06/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate environmental literacy

Duration of Unit: 20 hours

Unit Description

This unit describes the competencies required to control environmental hazard, control environmental pollution, comply with workplace sustainable resource use and evaluate current practices in relation to resource usage.

Summary of Learning Outcomes

1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use
4. Evaluate current practices in relation to resource usage

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Control environmental hazard	<ul style="list-style-type: none">• Purposes and content of Environmental Management and Coordination Act 1999• Purposes and content of Solid Waste Act• Storage methods for environmentally hazardous materials• Disposal methods of hazardous wastes• Types and uses of PPE in line with environmental regulations• Occupational Safety and Health Standards (OSHS)	<ul style="list-style-type: none">• Written questions• Oral questions• Observation of work procedures
2. Control environmental Pollution control	<ul style="list-style-type: none">• Types of pollution• Environmental pollution control measures• Types of solid wastes	<ul style="list-style-type: none">• Written questions• Oral questions

	<ul style="list-style-type: none"> • Procedures for solid waste management • Different types of noise pollution • Methods for minimizing noise pollution 	<ul style="list-style-type: none"> • Observation of work procedures • Role play
3. Demonstrate sustainable resource use	<ul style="list-style-type: none"> • Types of resources • Techniques in measuring current usage of resources • Calculating current usage of resources • Methods for minimizing wastage • Waste management procedures • Principles of 3Rs (Reduce, Reuse, Recycle) • Methods for economizing or reducing resource consumption 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation of work procedures • Role play
4. Evaluate current practices in relation to resource usage	<ul style="list-style-type: none"> • Collection of information on environmental and resource efficiency systems and procedures, • Measurement and recording of current resource usage • Analysis and recording of current purchasing strategies. • Analysis of current work processes to access information and data • Identification of areas for improvement 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation of work procedures • Role play
5. Identify Environmental legislations/conventions for environmental concerns	<ul style="list-style-type: none"> • Environmental issues/concerns • Environmental legislations /conventions and local ordinances • Industrial standard /environmental practices 	<ul style="list-style-type: none"> • Written questions • Oral questions • Observation of work procedures

	<ul style="list-style-type: none">• International Environmental Protocols (Montreal, Kyoto)• Features of an environmental strategy	
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Suggested Delivery Methods

- Instructor led facilitation of theory
- Practical demonstration of tasks by trainer
- Practice by trainees/ role play
- Discussion
- Observations and comments and corrections by trainers

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Solid Waste Act
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: AGR/CU/API/BC/07/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Demonstrate Safety and Health Practices

Duration of Unit: 20 hours

Unit Description

This unit describes the competencies required to practice safety and health and comply with OSH requirements relevant to work.

Summary of Learning Outcomes

1. Observe workplace procedures for hazards and risk prevention
2. Participate in arrangements for workplace safety and health maintenance

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Observe workplace procedures for hazards and risk prevention	<ul style="list-style-type: none">• Arrangement of work area and items in accordance with Company housekeeping procedures• Adherence to work standards and procedures• Application of preventive and control measures, including use of safety gears/PPE• Study and apply standards and procedures for incidents and emergencies.	<ul style="list-style-type: none">• Oral questions• Written questions• Observation of work procedures
2. Participate in arrangements for workplace safety and health maintenance	<ul style="list-style-type: none">• Participating in orientations on OSH requirements/regulations of tasks• Providing feedback on health, safety, and security concerns to appropriate personnel as required in a sufficiently detailed manner	<ul style="list-style-type: none">• Oral questions• Written tests• Practical test• Observation of practical work by trainees

	<ul style="list-style-type: none"> • Practice workplace procedures for reporting hazards, incidents, injuries and sickness • OSH requirements/ regulations and workplace safety and hazard control procedures are reviewed, and compliance reported to appropriate personnel • Identification of needed OSH-related trainings are proposed to appropriate personnel 	
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Suggested Delivery Methods

- Instructor led facilitation of theory
- Practical demonstration of tasks by trainer
- Practice by trainees/ role play
- Discussion
- Observations and comments and corrections by trainers

Recommended Resources

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer’s specifications and instructions
- Personal Protective Equipment (PPE) e.g.
 - Mask
 - Face mask/shield
 - Safety boots
 - Safety harness
 - Arm/Hand guard, gloves
 - Eye protection (goggles, shield)
 - Hearing protection (ear muffs, ear plugs)
 - Hair Net/cap/bonnet
 - Hard hat
 - Face protection (mask, shield)
 - Apron/Gown/coverall/jump suit
 - Anti-static suits
 - High-visibility reflective vest

CORE UNITS OF LEARNING

BEE BIOLOGY AND BEHAVIOUR

UNIT CODE: AGR/CU/API/CR/01/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: demonstrate understanding of bee biology and behaviour

Duration of Unit: 30 hours

Unit Description

This unit specifies the competencies required to demonstrate understanding of bee biology and behaviour. It involves demonstrating understanding of bee keeping industry in Kenya, identifying bee races, demonstrating understanding of bee lifecycle and caste, demonstrating understanding of the physiological system of bees, determining bee nutrition and demonstrating the understanding of bee behaviour.

Summary of Learning Outcomes

- 1 Demonstrate understanding of bee keeping industry in Kenya
- 2 Identify bee races
- 3 Demonstrate understanding of bee lifecycle and caste
- 4 Demonstrate understanding of the physiological system of bees
- 5 Determine bee nutrition
- 6 Demonstrate the understanding of bee behaviour

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Demonstrate understanding of bee keeping industry in Kenya	<ul style="list-style-type: none"><input type="checkbox"/> Meaning of terms apiculture, bee keeping, honey bees, traditional bee keeping and improved bee keeping<input type="checkbox"/> Historical background of bee keeping<input type="checkbox"/> Economic importance of bee keeping<input type="checkbox"/> Bee keeping production systems<input type="checkbox"/> Status of the bee keeping industry	<ul style="list-style-type: none"><input type="checkbox"/> Written test<input type="checkbox"/> Observation<input type="checkbox"/> Third party report<input type="checkbox"/> Oral questioning<input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
	<input type="checkbox"/> Institutional and legal aspects in bee keeping <input type="checkbox"/>	
2. Identify bee races	<input type="checkbox"/> Materials and equipment for identification of bee species <input type="checkbox"/> Bee parts/external morphology/bee anatomy <input type="checkbox"/> Bee races	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
3. Demonstrate understanding of bee lifecycle and caste	<input type="checkbox"/> Meaning of terms drone, worker, queen bees <input type="checkbox"/> Caste determination <input type="checkbox"/> Development stages of different castes <input type="checkbox"/> Roles of drones, workers, queen bees <input type="checkbox"/> Lifespan of different bee castes	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
4. Demonstrate understanding of the physiology and anatomy of honey bees	<input type="checkbox"/> Meaning of terms morphology <input type="checkbox"/> External features of queen bee <input type="checkbox"/> External features of drone <input type="checkbox"/> External features of worker bee <input type="checkbox"/> Internal features of queen bee <input type="checkbox"/> Internal features of drone <input type="checkbox"/> Internal features of worker bee <input type="checkbox"/> Glandular system <input type="checkbox"/> Reproductive system	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
5. Demonstrate the understanding of bee behaviour	<input type="checkbox"/> Meaning of terms swarming, absconding, migration and Supercedure, robbing activity, foraging behaviour <input type="checkbox"/> Types of swarming <input type="checkbox"/> Communication among honey bees <input type="checkbox"/> Colony defence <input type="checkbox"/> Mating behaviour in bees <input type="checkbox"/> Factors affecting bee behaviour <input type="checkbox"/> Methods of controlling bee behaviour	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
6. Demonstrate understanding of bee nutrition	<input type="checkbox"/> Nutrition requirements for bees <input type="checkbox"/> Types of feed and supplements for bees	<input type="checkbox"/> Written test <input type="checkbox"/> Observation

Learning Outcome	Content	Suggested Assessment Methods
	<input type="checkbox"/> Feed quality <input type="checkbox"/> Feeding methods <input type="checkbox"/> Feeding equipment <input type="checkbox"/> Artificial feeding procedure in bees	<input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

1. Hand lens
2. Feeder box
3. Catcher box
4. Observation hive
5. Supplement and substitutes ingredients

APIARY ESTABLISHMENT AND MANAGEMENT

UNIT CODE: AGR/CU/API/CR/02/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: establish an apiary

Duration of Unit: 50 hours

Unit Description

This unit specifies the competencies required to establish an apiary. It involves selecting apiary site, clearing apiary site, fencing apiary site, preparing bee hives, installing bee hives and constructing bee house

Summary of Learning Outcomes

1. Select apiary site
2. Clear apiary site
3. Fence apiary site
4. Prepare bee hives
5. Install bee hives
6. Construct bee house
7. Manage apiary facilities

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Select apiary site	<ul style="list-style-type: none"><input type="checkbox"/> Meaning of terms-apiary<input type="checkbox"/> Types of apiaries<input type="checkbox"/> Key factors to consider when selecting an apiary site<input type="checkbox"/> Designing and setting up an apiary	<ul style="list-style-type: none"><input type="checkbox"/> Written test<input type="checkbox"/> Observation<input type="checkbox"/> Third party report<input type="checkbox"/> Oral questioning<input type="checkbox"/> Interviews
2. Clear apiary site	<ul style="list-style-type: none"><input type="checkbox"/> Materials, tools and equipment for clearing the apiary site , their use and maintenance<input type="checkbox"/> Types of materials and objects to be cleared from an apiary site.<input type="checkbox"/> Methods of disposal of waste material cleared from the apiary sites.	<ul style="list-style-type: none"><input type="checkbox"/> Written test<input type="checkbox"/> Observation<input type="checkbox"/> Third party report<input type="checkbox"/> Oral questioning<input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
3. Fence apiary site	<input type="checkbox"/> Importance of fencing an apiary site <input type="checkbox"/> Materials, tools and equipment for fencing the apiary site , their use and maintenance <input type="checkbox"/> Demarcation/mapping of apiary sites <input type="checkbox"/> Fencing methods <input type="checkbox"/> Procedure for fencing an apiary site	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
4. Prepare bee hives	<input type="checkbox"/> Types of bee hives <input type="checkbox"/> Materials, tools and equipment used to prepare hives <input type="checkbox"/> Procedure for cleaning the hive <input type="checkbox"/> Types of baits <input type="checkbox"/> Importance of labelling hives <input type="checkbox"/> Hive labelling methods	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
5. Construct bee house	<input type="checkbox"/> Meaning of a bee house <input type="checkbox"/> Types of bee houses <input type="checkbox"/> Importance of a bee house <input type="checkbox"/> Limitations of a bee house <input type="checkbox"/> Materials, tools and equipment for constructing the bee house, their use and maintenance <input type="checkbox"/> Factors to consider when selecting bee house site <input type="checkbox"/> Procedure of bee house construction <input type="checkbox"/> Post construction activities	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
6. Install bee hives	<input type="checkbox"/> Factors to consider when installing bee hives <input type="checkbox"/> Hive hanging and placement methods and patterns	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
7. Manage bee forage resources	<input type="checkbox"/> Types of bee forage <input type="checkbox"/> Establishment and management bee forage and water resources <input type="checkbox"/> Floral density assessment <input type="checkbox"/> Preparation of a floral calendar <input type="checkbox"/> Different ecological zones	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
8. Manage apiary facilities	<input type="checkbox"/> Routine apiary management <input type="checkbox"/> Pest control measures <input type="checkbox"/> Repair and maintenance of apiary facilities <input type="checkbox"/> Types of apiary records	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report

Learning Outcome	Content	Suggested Assessment Methods
		<input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

1. Bee hives
2. Colonies
3. Platforms and hanging posts
4. Bee house
5. Hive hanging wires
6. Bees forage and water resources
7. Farm tools
8. PPE
9. Posts
10. Roofing materials
11. Rafters
12. Timber
13. Chain link

BEE FORAGE RESOURCES AND MANAGEMENT

UNIT CODE: AGR/CU/API/CR/03/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: manage bee forage resources

Duration of Unit: 40 hours

Unit Description

This unit specifies the competencies required to manage bee forage resources. It involves identifying suitable bee forage, establishing bee forage resources, conserving forage resources and developing a beekeeping floral calendar.

Summary of Learning Outcomes

- 1 Identify suitable bee forage
- 2 Establish bee forage resources
- 3 Develop a beekeeping floral calendar
- 4 Conserve bee forage resources
- 5 Honey bee pollination

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify suitable bee forage	<ul style="list-style-type: none"> <input type="checkbox"/> Meaning of bee forage <input type="checkbox"/> Types/classes of bee forage plants <input type="checkbox"/> Uses of bee forage resources <input type="checkbox"/> Geographical distribution of bee forage resources <input type="checkbox"/> Ecological requirements for bee forage resources <input type="checkbox"/> The floral calendar <input type="checkbox"/> Gaps in the floral cycle <input type="checkbox"/> Bee forage gap identification <input type="checkbox"/> Types of documented bee forage manuals 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
2. Establish bee forage resources	<ul style="list-style-type: none"> <input type="checkbox"/> Site selection for the establishment of bee forage resources <input type="checkbox"/> Tools and equipment for establishing bee forage resources <input type="checkbox"/> Preparation of the site for bee forage resource establishment 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> <input type="checkbox"/> Propagation and husbandry methods. <input type="checkbox"/> Propagation materials <input type="checkbox"/> Procedure for propagating forage species <input type="checkbox"/> Types of post- forage establishment activities 	
3. Develop a beekeeping floral calendar	<ul style="list-style-type: none"> <input type="checkbox"/> Types of bee forage species <input type="checkbox"/> Geographical distribution/coverage <input type="checkbox"/> Factors affecting flowering cycles <input type="checkbox"/> Flowering seasons/patterns for different plant species 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
4. Conserve bee forage resources	<ul style="list-style-type: none"> <input type="checkbox"/> Meaning of conservation <input type="checkbox"/> Conservation methods <input type="checkbox"/> Plant genetic materials <input type="checkbox"/> Api-agroforestry programmes <input type="checkbox"/> Re-afforestation <input type="checkbox"/> Community-based conservation <input type="checkbox"/> Vegetation surveys <input type="checkbox"/> Community reserve areas <input type="checkbox"/> Woodlots <input type="checkbox"/> Multipurpose plant species <input type="checkbox"/> Effects of climate change on bee forage resources <input type="checkbox"/> Land degradation <input type="checkbox"/> Mitigation measures for the effects of human activities 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
5. Honey bee pollination	<ul style="list-style-type: none"> <input type="checkbox"/> Meaning of pollination <input type="checkbox"/> Types of pollination <input type="checkbox"/> Agents of pollination <input type="checkbox"/> Benefits of bee pollination <input type="checkbox"/> Conservation of bees for pollination <input type="checkbox"/> Pollination services <input type="checkbox"/> Safe pesticide use <ul style="list-style-type: none"> <input type="checkbox"/> Protection of bees from pesticide poisoning <input type="checkbox"/> Mode of action of pesticides on bees 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
	<ul style="list-style-type: none"> ○ Registration of pesticides ○ Species specific pesticides ○ Integrated pest management 	

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

- 1 Tree nurseries
- 2 Land
- 3 Water
- 4 Manure/fertilizer
- 5 Planting materials
- 6 Propagation tool and equipment
- 7 Human resource

HONEY BEE SWARM MANAGEMENT

UNIT CODE: AGR/CU/API/CR/04/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: manage honey bee swarms

Duration of Unit: 60 hours

Unit Description

This unit specifies the competencies required to manage honey bee swarms. It involves preparing to catch/trap a swarm of honey bees, catching/trapping a swarm of honey bees and managing swarming behaviour in a honey bee colony

Summary of Learning Outcomes

- 1 Prepare to catch/trap a swarm of honey bees
- 2 Catch/trap a swarm of honey bees
- 3 Perform post-trapping activities

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare to catch/trap a swarm of honey bees	<ul style="list-style-type: none"> <input type="checkbox"/> Meaning of a honey bee swarm <input type="checkbox"/> Materials and equipment for catching /trapping a swarm of honey bees <input type="checkbox"/> Swarming seasons <input type="checkbox"/> Trapping sites/bee migratory routes <input type="checkbox"/> PPE in catching /trapping a swarm of honey bees <input type="checkbox"/> Occupational safety and health in catching /trapping a swarm of honey bees 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
2. Catch/trap a swarm of honey bees	<ul style="list-style-type: none"> <input type="checkbox"/> Trapping sites <input type="checkbox"/> Catcher box/brood box baiting <input type="checkbox"/> Types of baits <input type="checkbox"/> Baiting techniques <input type="checkbox"/> Reasons for catching /trapping a swarm of honey bees <input type="checkbox"/> Method of catching /trapping a swarm of honey bees 	<ul style="list-style-type: none"> <input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
	<input type="checkbox"/> Procedure for catching /trapping a swarm of honey bees <input type="checkbox"/> Swarm transportation methods and procedure	
3. Perform post-trapping activities	<input type="checkbox"/> Meaning of post-trapping <input type="checkbox"/> Hive stocking techniques <input type="checkbox"/> Regular colony monitoring <input type="checkbox"/> Types of colony management measures <input type="checkbox"/> Procedure for removing a swarm from unwanted nesting sites <input type="checkbox"/> Artificial feeding in honey bee swarms	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

- 1 Catcher box
- 2 Bee swarms
- 3 Smoker
- 4 Rope
- 5 Ladder
- 6 Swarm catcher
- 7 Bees wax
- 8 Propolis
- 9 Plants based baits.

HONEY BEE COLONY MANAGEMENT

UNIT CODE: AGR/CU/API/CR/05/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: manage honey bee colony

Duration of Unit: 60 hours

Unit Description

This unit specifies the competencies required to manage honey bee colony. It involves preparing for honey bee colony manipulation, handling honey bee combs, handling honey bee colonies, rearing queen bees and performing post-manipulation practices.

Summary of Learning Outcomes

- 1 Prepare for honey bee colony manipulation
- 2 Handle honey bee combs
- 3 Handle honey bee colony
- 4 Rear queen bees
- 5 Perform post-manipulation practices

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare for honey bee colony manipulation	<input type="checkbox"/> Meaning of apiary records, honey bee colony manipulation <input type="checkbox"/> Types of apiary records <input type="checkbox"/> Preparation of the management schedule <input type="checkbox"/> Materials and equipment for manipulation of honey bees <input type="checkbox"/> Contents of PPE kit	<input type="checkbox"/> Written <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
2. Handle honey bee combs	<input type="checkbox"/> Procedure for opening a bee hive <input type="checkbox"/> Procedure for handling combs <input type="checkbox"/> Types of combs <input type="checkbox"/> The concept of bee space <input type="checkbox"/> Comb construction pattern <input type="checkbox"/> Comb sequence in a colony	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
3. Handle honey bee colony	<input type="checkbox"/> Tools and equipment for colony manipulation <input type="checkbox"/> Desirable colony traits <input type="checkbox"/> Colony division procedure <input type="checkbox"/> Optimum conditions that should prevail in the brood nest	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	<input type="checkbox"/> Colony transfer procedure <input type="checkbox"/> Merging bee colonies <input type="checkbox"/> Feeding bee colonies <input type="checkbox"/> Types of colony records	<input type="checkbox"/> Interviews
4. Rear queen bees	<input type="checkbox"/> Meaning of the term selection and propagation <input type="checkbox"/> Desirable colony traits <input type="checkbox"/> Tools and equipment for selection and propagation <input type="checkbox"/> De-queening and re-queening procedure <input type="checkbox"/> Queen bee rearing techniques <ul style="list-style-type: none"> ○ Artificial insemination techniques <input type="checkbox"/> Queen bee packaging and transportation	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
5. Perform post-colony manipulation practices	<input type="checkbox"/> Types of manipulation records and their preparation <input type="checkbox"/> Phytosanitary measures <input type="checkbox"/> Colony performance monitoring <input type="checkbox"/> Waste disposal	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

1. Bee colonies
2. PPE kit
3. Catcher box
4. Smoker
5. Hives
6. Queen cages
7. Grease

HONEY BEE PESTS AND DISEASE CONTROL

UNIT CODE: AGR/CU/API/CR/06/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: control honey bee pests and diseases

Duration of Unit: 70 hours

Unit Description

This unit specifies the competencies required to control pests and disease within a honey bee colony. It involves inspecting the bee colony, assessing health and condition of bee brood, assessing health and condition of adult bees and identifying and managing bee pests and diseases.

Summary of Learning Outcomes

- 1 Prepare to inspect the bee colony/apiary
- 2 Assess health and condition of bee brood
- 3 Assess health and condition of adult bees
- 4 Manage bee pests and diseases

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare to inspect the bee colony and the apiary	<input type="checkbox"/> Meaning of terms pests, predators, brood diseases <input type="checkbox"/> Materials, tools and equipment for inspecting the bee colony and the apiary <input type="checkbox"/> Procedures for opening a bee hive <input type="checkbox"/> Types of pests and predators and their effects <input type="checkbox"/> Types of diseases and their effects	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
2. Assess health and condition of bee brood	<input type="checkbox"/> Types of brood <input type="checkbox"/> Types of bee brood diseases <input type="checkbox"/> Pest identification <input type="checkbox"/> Signs and symptoms of brood pest infestation and diseases <input type="checkbox"/> Sample collection and testing <input type="checkbox"/> Bee brood inspection records	<input type="checkbox"/> Written <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Learning Outcome	Content	Suggested Assessment Methods
3. Assess health and condition of adult bees	<input type="checkbox"/> Types of adult bee diseases <input type="checkbox"/> Signs and symptoms of adult bees diseases <input type="checkbox"/> Sample collection and testing <input type="checkbox"/> Adult bees inspection records	<input type="checkbox"/> Written <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
4. Manage bee pests and diseases	<input type="checkbox"/> Affected colony identification <input type="checkbox"/> Remedial measures in managing bee pests and diseases <input type="checkbox"/> Integrated pest management <input type="checkbox"/> Safe pesticides/herbicides use <input type="checkbox"/> Pest and disease surveillance <input type="checkbox"/> Methods of strengthening bee colonies <input type="checkbox"/> Methods of infected colony destruction	<input type="checkbox"/> Written <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

- 1 Bee colonies
- 2 Smoker
- 3 PPE
- 4 Bee hives
- 5 Feed supplements
- 6 Feeding tools and materials

BEE PRODUCTS HARVESTING

UNIT CODE: AGR/CU/API/CR/07/4/A

Relationship to Occupational Standards

This unit addresses the unit of competency: harvest bee products

Duration of Unit: 30 hours

Unit Description

This unit specifies the competencies required to harvest bee products. It involves preparing to harvest bee products, conducting bee product harvesting, extracting bee products and performing post-harvest practices.

Summary of Learning Outcomes

- 1 Prepare to harvest bee products
- 2 Conduct bee product Harvesting
- 3 Extract bee products
- 4 Perform post-harvest practices

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Prepare to harvest bee products	<ul style="list-style-type: none"><input type="checkbox"/> Meaning of terms honey, propolis, bees wax, royal jelly, bee venom, bee brood, pollen, bee bread<input type="checkbox"/> Uses of bee products<input type="checkbox"/> Materials, tools and equipment for harvesting bee products<input type="checkbox"/> Bee harvest timing and weather conditions<input type="checkbox"/> Occupational health and safety procedures in bee products harvesting<input type="checkbox"/> Smoker lighting and types of smoker fuel<input type="checkbox"/> Protective dressing for bee products harvesting	<ul style="list-style-type: none"><input type="checkbox"/> Written test<input type="checkbox"/> Observation<input type="checkbox"/> Third party report<input type="checkbox"/> Oral questioning<input type="checkbox"/> Interviews
2. Conduct bee product harvesting	<ul style="list-style-type: none"><input type="checkbox"/> Procedure for hive opening<input type="checkbox"/> Characteristics of ripe honey<input type="checkbox"/> Handling honey and brood combs<input type="checkbox"/> Honey harvesting techniques	<ul style="list-style-type: none"><input type="checkbox"/> Written test<input type="checkbox"/> Observation<input type="checkbox"/> Third party report

Learning Outcome	Content	Suggested Assessment Methods
	<input type="checkbox"/> Propolis harvesting techniques <input type="checkbox"/> Procedure for harvesting royal jelly <input type="checkbox"/> Pollen harvesting techniques	<input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
3. Extract bee products	<input type="checkbox"/> Materials and tools for extracting bee products i.e. honey, propolis, bees wax, royal jelly, bee venom, bee brood, pollen <input type="checkbox"/> Procedure for extracting bee products i.e. honey, propolis, bees wax, royal jelly, bee venom, bee brood, pollen <input type="checkbox"/> Hygienic handling harvested bee products <input type="checkbox"/> Occupational health and safety procedures in bee products extraction	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews
4. Perform post-harvest practices	<input type="checkbox"/> Weighing and grading equipment <input type="checkbox"/> Types of bee production records and their preparation <input type="checkbox"/> Transportation methods for bee products <input type="checkbox"/> Bee products storage equipment and conditions	<input type="checkbox"/> Written test <input type="checkbox"/> Observation <input type="checkbox"/> Third party report <input type="checkbox"/> Oral questioning <input type="checkbox"/> Interviews

Suggested Methods of Delivery

- Projects
- Demonstration by trainer
- Practice by the trainee
- Discussions
- Direct instruction

Recommended Resources

- 1 Propolis collector
- 2 Pollen trap
- 3 Honey extractor
- 4 Venom collector
- 5 Harvesting containers
- 6 Smokers
- 7 PPE kit
- 8 Bees wax extractor

- 9 Bee brush
- 10 Bee escape
- 11 Food grade storage equipment