****

**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**SALT PROCESSING**

**LEVEL 4**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

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**Council Secretary/CEO**

**TVET Curriculum Development, Assessment and Certification Council**

**P.O. Box 15745–00100**

**Nairobi, Kenya**

**Email:** [**info@tvetcdacc.go.ke**](mailto:info@tvetcdacc.go.ke)

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 in 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 the 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 Mining sector’s growth.

**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 labor force.

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

This curriculum has been developed following the CBET framework policy; the CBETA Standards and guidelines provided by the TVET Authority and the Kenya National Qualification framework designed by the Kenya National Qualification Authority.

This curriculum is designed and organized with an outline of learning outcomes; Suggested methods of Instruction, 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, Mining Sector Skills Advisory Committee (SSAC), expert workers and all those who participated in the development of this curriculum.

**CHAIRPERSON, TVET CDACC**

# ACKNOWLEDGEMENT

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 organisations.

I recognize with appreciation the role of the Mining SSAC in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Mining 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 Mining sector acquire competencies that will enable them to perform their work more efficiently.

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

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# ACRONYMS AND ABBREVIATIONS

BC: Basic competency

CBET: Competency Based Education and Training

CC: Common competency

CR: Core competency

CU: Curriculum

KCSE: Kenya Certificate of Secondary Education

KNQA: Kenya National Qualifications Authority

OSH: Occupational Safety and Health

PPE: Personal Protective Equipment

SSAC: Sector Skills Advisory Committee

TVET: Technical and Vocational Education and Training

TVET CDACC: TVET Curriculum Development, Assessment and Certification Council

# KEY TO UNIT CODE

**MIN/CU/SP/BC /01/4 / A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# COURSE OVERVIEW

Salt processing Level 4 qualification consists of units of learning that a person must achieve to enable him/her to maintain salt evaporation ponds, perform salt washing operations; salt drying, salt grinding and salt packaging.

The units of learning comprising this qualification include the following basic, common and core:

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit factor** |
| MIN/CU/SALT/CR/01/4/A | Communication skills | 20 | 2.0 |
| MIN/CU/SALT/CR/02/4/A | Numeracy skills | 25 | 2.5 |
| MIN/CU/SALT/CR/03/4/A | Digital literacy | 35 | 3.5 |
| MIN/CU/SALT/CR/04/4/A | Entrepreneurial skills | 60 | 60.0 |
| MIN/CU/SALT/CR/05/4/A | Employability skills | 30 | 3.0 |
| MIN/CU/SALT/CR/06/4/A | Environmental literacy | 20 | 2.0 |
| MIN/CU/SALT/CR/07/4/A | Occupational safety and health practices | 20 | 2.0 |
| **Total** | | **210** | **21.0** |

**Common Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit of Learning Code** | **Unit of Learning Title** | **Duration in Hours** | **Credit Factors** |
| MIN/CU/SP/CC/01/4A | Chemistry for mining technology | 105 | 10.5 |
|  | **Total** | 105 | 10.5 |

**Core Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit of Learning Code** | **Unit of Learning Title** | **Duration in Hours** | **Credit Factors** |
| MIN/CU/SALT/CR/01/4/A | Evaporation ponds | 75 | 7.5 |
| MIN/CU/SALT/CR/02/4/A | Salt washing | 50 | 5.0 |
| MIN/CU/SALT/CR/03/4/A | Salt drying | 50 | 5.0 |
| MIN/CU/SALT/CR/04/4/A | Salt grinding | 80 | 8.0 |
| MIN/CU/SALT/CR/05/4/A | Salt packaging | 60 | 6.0 |
|  | Industrial attachment | 300 | 30 |
| **Total** | | **615** | **61.5** |
| **Grand total** | | **930** | **93** |

The total duration of the course is 930 hours including 300 hours’ industrial attachment.

**Entry Requirements**

A trainee entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Secondary Education (K.C.S.E) Mean Grade E

**Or**

1. Equivalent qualification as determined by Kenya National Qualifications Authority (KNQA)

**Industrial Attachment**

An individual enrolled in this course will undergo three hundred (300) hours industrial attachment in a Salt mining firm.

**Assessment**

The course will be assessed at two levels: internal and external.

1. **Internal assessment**: conducted continuously by the trainer (internal assessor) who is monitored by an accredited internal verifier.
2. **External assessment**: conducted by an external assessor who is monitored by an accredited external verifier.

The assessors and verifiers are accredited by TVET CDACC which also coordinates external assessment.

**Certification**

An individual will be awarded a Certificate of Competency on demonstration of competence in a unit of competency. To be awarded a National Certificate in Salt Processing level 4 an individual must demonstrate competence in all the units of competency.

These certificates will be awarded by TVET CDACC in conjunction with the training provider.

# BASIC UNITS OF LEARNING

# COMMUNICATION SKILLS

**UNIT CODE:** MIN/CU/SP/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 covers the competencies required demonstrate communication skills. It involves obtaining and conveying workplace information, completing relevant work-related documents, communicating information about workplace processes, leading workplace discussion and communicating workplace issues.

**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 discussions
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 | * 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 | * Interview * Third party reports |
| 1. Complete relevant work-related documents | * Types and purposes of workplace documents and forms * Methods used in filling forms and documents * Recording workplace data * Process of distributing workplace forms and documents * Report writing * Types of workplace reports | * Interview * Third party reports |
| 1. Communicate information about workplace processes | * 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 | * Interview * Portfolio |
| 1. Lead workplace discussion | * Methods of discussion e.g.   + Coordination meetings   + Toolbox discussion   + Peer-to-peer discussion * Solicitation of response | * Interview * Third party reports |
| 1. Identify and communicate issues arising in the workplace | * Identification of problems and issues * Organizing information on problems and issues * Relating problems and issues * Communication barriers affecting workplace discussions | * Interview * Portfolio |

**Suggested Methods of Instructions**

* Direct instruction
* Demonstration
* Practice assignment
* Discussion
* Role play
* Brainstorming

**Recommended Resources**

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

# NUMERACY SKILLS

**UNIT CODE:** MIN/CU/SP/BC/02/4/A

**Relationship to Occupational Standards:**

This unit addresses the Unit of Competency: Demonstrate Numeracy Skills

**Duration of Unit:** 25hours

**Unit Description**

This unit covers the competencies required to demonstrate numeracy skills. It involves identifying and using whole numbers and simple fractions, decimals and percentages for work, identifying, measuring and estimating familiar quantities for work, reading and using familiar maps, plans and diagrams for work, identifying and describing common 2D and some 3D shapes for work, constructing simple tables and graphs for work using familiar data and identifying and interpreting 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 | * Whole numbers * Simple fractions * Decimals * Percentages * Sizes * Problem solving methods * Calculations using the 4 operations * Recording and communicating numerical information | * Written * Practice assignments |
| 2. Identify, measure and estimate familiar quantities for work | * 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 | * Written * Practice assignments |
| 3. Read and use familiar maps, plans and diagrams for work | * 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 | * Practical test * Written |
| 4. Identify and describe common 2D and some 3D shapes for work | * 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 | * Written * Practical test |
| 5. Construct simple tables and graphs for work using familiar data | * 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 | * Written * Practical test |
| 6. Identify and interpret information in familiar tables, graphs and charts for work | * 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 | * Written * Practical test |

**Suggested Methods of Instructions**

* 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**

* Computers
* Stationery
* Charts
* Video clips
* Audio tapes
* LCD projectors
* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Projectors
* Writing boards
* Mathematical tables

# DIGITAL LITERACY

**UNIT CODE:** MIN/CU/SP/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 demonstrate digital literacy in a working environment. It entails identifying computer software and hardware, applying security measures to data, hardware, software, applying computer software in solving task sand applying internet and email in communication at workplace.

**Summary of Learning Outcomes**

1. Identify computer software and hardware
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 | * Meaning of a computer * Functions of a computer * Components of a computer * Classification of computers | * Written tests * Oral * Observation |
| 1. Apply security measures to data, hardware and software | * Data security and control * Security threats and control measures * Types of computer crimes * Detection and protection against computer crimes | * Written tests * Oral presentation * Observation * Projects |
| 1. Apply computer software in solving tasks | * Operating system * Word processing * Spread sheets * Data base | * Oral questioning * Observation * Project |
| 1. Apply internet and email in communication at workplace | * Computer networks * Uses of internet * Electronic mail (e-mail) concept | * Oral questioning * Observation * Oral presentation * Written report |

**Suggested Methods of Instructions**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practical assignment
* Viewing of related videos
* Project
* Group discussions

**Recommended Resources**

* Desktop computers
* Laptop computers
* Other digital devices
* Printers
* Storage devices
* Internet access
* Computer software

# ENTREPRENEURIAL SKILLS

**UNIT CODE:** MIN/CU/SP/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 covers the competencies required for creating and maintaining small scale business, establishing small business customer base, managing and growing a micro/small-scale 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 | * 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 * 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 | * Individual/group assignments * projects * Written * Oral |
| 1. Establish small scale business customer base | * 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 * Business opportunities | * Individual/group assignments * projects * Written * Oral |
| 1. Manage small scale business | * 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 | * Oral * Individual/group assignments * projects * Written |
| 1. Grow/expand small scale business | * Methods of growing small business * Resources for growing small business * Small business growth plan * Computer software in business development * ICT and business growth | * Individual/group assignments * projects * Written |

**Suggested Methods of Instructions**

* 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:** MIN/CU/SP/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 | * 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 * Healthy lifestyle practices | * Written tests * Oral questioning * Portfolio of evidence * Third party report |
| 1. Demonstrate critical safe work habits | * Stress and stress management * Punctuality and time consciousness * Interpersonal communication * Sharing information * Leisure * Integratingpersonal objectives into organizational objectives * Resources utilization * Setting work priorities * HIV and AIDS * Drug and substance abuse * Handling emerging issues | * Written tests * Oral questioning * Portfolio of evidence * Third party report |
| 1. Demonstrate workplace learning | * 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 | * Written tests * Oral questioning * Portfolio of evidence * Third party report |
| 1. Demonstrate workplace ethics | * Meaning of ethics * Ethical perspectives * Principles of ethics * Values and beliefs * Ethical standards * Organization code of ethics * Common ethical dilemmas * Organization culture * 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 | * Written tests * Oral questioning * Portfolio of evidence * Third party report |

**Suggested Methods of Instructions**

* Simulation/Role play
* Group Discussion
* Presentations
* Q&A
* Case studies
* Assignments

**Recommended Resources**

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

# ENVIRONMENTAL LITERACY

**UNIT CODE:** MIN/CU/SP/BC/06/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Environmental Literacy

**Duration of Unit:** 20hours

**Unit Description**

This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution, demonstrating sustainable resource use and evaluating current practices in relation to resource usage.

**Summary of Learning Outcomes**

1. Control environmental hazard
2. Control environmental pollution
3. Demonstrate sustainable use of resources
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 | * 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) | * Written tests * Oral questions * Observation of work procedures |
| 1. Control environmental Pollution | * Types of pollution * Environmental pollution control measures * Types of solid wastes * Procedures for solid waste management * Different types of noise pollution * Methods for minimizing noise pollution | * Written tests * Oral questions * Observation of work procedures * Role play |
| 1. Demonstrate sustainable resource use | * 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 | * Written tests * Oral questions * Observation of work procedures |
| 1. Evaluate current practices in relation to resource usage | * 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 | * Written tests * Oral questions * Observation of work procedures |
| 1. Identify Environmental legislations/conventions for environmental concerns | * Environmental issues/concerns * Environmental legislations /conventions and local ordinances * Industrial standard /environmental practices * International Environmental Protocols (Montreal, Kyoto) * Features of an environmental strategy | * Written tests * Oral questions * Observation of work procedures |

**Suggested Methods of Instructions**

* 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**

* Computers
* Stationery
* Charts
* Video clips
* Audio tapes
* Radio sets
* TV sets
* LCD projectors
* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)

# OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** MIN/CU/SP/BC/07/4/A

**Relationship to Occupational Standards**

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

**Duration of Unit:** 20 hours

**Unit Description**

This unit specifies the competencies required to practice safety and health and comply with OSH requirements relevant to work. It involves adhering to workplace procedures for hazards and risk prevention and participating in arrangements for workplace safety and health maintenance.

**Summary of Learning Outcomes**

1. Adhere to 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. Adhere to workplace procedures for hazards and risk prevention | * 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. | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Participate in arrangements for workplace safety and health maintenance | * 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 * 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 | * Oral questions * Written tests * Portfolio of evidence * Third party report |

**Suggested Methods of Instructions**

* Assigments
* Discussion
* Q&A
* Role play
* Viewing of related videos

**Recommended Resources**

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

# COMMON UNITS OF LEARNING

# CHEMISTRY FOR SALT PROCESSING

**UNIT CODE:** MIN/CU/SP/CC/01/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: apply basic chemistry principles.

**Duration of Unit: 105** hours

**UNIT DESCRIPTION**

This unit covers the competencies required to apply basic chemistry principles. It involves applying inorganic chemistry, basic physical chemistry and basic analytical chemistry.

**Summary of Learning Outcomes**

1. Apply inorganic chemistry
2. Apply physical chemistry
3. Apply analytical chemistry

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply basic inorganic chemistry | * Matter * Geochemical Fundamentals * Isotope Geochemistry * Atomic Structure And Bonding * The Periodic Table * Chemistry of Transition Elements * Minerals and Ores * Radioactivity and Nuclear Chemistry | * Written tests * Observation * Oral questions * Assignment * Practical’s |
| 1. Apply basic physical chemistry | * Chemical and Ionic Equilibrium * Acids and Bases * Redox Potential and its Application. * Aqueous chemistry | * Written tests * Observation * Oral questions * Assignment * Practical’s |
| 1. Apply basic analytical chemistry | * Chemical analytical techniques * Separation Methods * Bulk (whole rock) chemical techniques | * Written tests * Observation * Oral questions * Assignment * Practical’s |

**Suggested Methods of Instruction**

* Direct instruction
* Practicals
* Demonstrations
* Group discussion
* Presentations
* Videos
* Assignments
* Role play
* Question and answer
* Modelling

**Recommended Resources**

* Computers
* Stationery
* Charts/posters/
* Publications
* Video clips
* LCD projector
* Chemicals
* Apparatus
* Equipment
* Reagents
* PPES
  + - * Gloves
      * Gas mask
      * Lab coat
      * Closed leather shoes
      * Goggles

# CORE UNITS OF LEARNING

# EVAPORATION PONDS

**UNIT CODE:** MIN/CU/SP/CR/01/4/A

**Relationship to Occupational Standards**

This unit of learning addresses the unit of competency: Maintain salt evaporation ponds

**Duration of Unit: 75** hours

**Unit Description**

This unit specifies competencies required to maintain salt evaporation ponds. It entails scheduling brine flow, maintaining pond gradient, collecting fluid samples and harvesting crystallized salt.

**Summary of Learning Outcomes**

1. Schedule brine flow
2. Maintain pond gradient
3. Collect fluid samples
4. Harvest crystallized salt

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Schedule brine flow | * Terms and concepts * Phases of matter * Sources of salt * Brine * Rock salt * Salt impurities and insoluble * Settling time * Sequential brine flow * Sedimentation in ponds * Methods of salt extraction * Crystallization of salts * Vacuum evaporator * Grainer | * Observation checklist * Oral questioning * Written tests * Practicals |
| 1. Maintain pond gradient | * Terms and concepts * Pond depth establishment * Siltation * Monitor brine flow * Gradient calculations | * Oral questions * Assignments * Presentations * Written tests |
| 1. Collect fluid samples | * Sample points identification * Fluid Sample collection * Recording of fluid sample data * Management of sample data | * Assignments * Presentations * Written tests * Practicals |
| 1. Harvest crystallized salt | * Harvesting equipment * Harvesting personnel * Volume estimations * Loading and haulage equipment * Harvesting procedure * Daily monitoring of pond activities * Data recording and maintenance of records | * Assignments * Presentations * Written tests * Practicals |

**Suggested methods of Instruction**

* Facilitation of theory by trainer
* Field trips
* Demonstration of task by trainer
* Practice by trainee

**Recommended Resources**

* Personal Protective Equipment
* Computers with internet connectivity
* Stationery
* White board
* Meteorological data
* Tractors
* Shovel
* Spade
* Loaders

# SALT WASHING

**UNIT CODE:** MIN/CU/SP/CR/02/4/A

**Relationship to Occupational Standards**

This unit of learning addresses the unit of competency: perform salt washing operations

**Duration of Unit: 50 hours**

**Unit Description**

This unit specifies competencies required to perform salt washing operations. It entails conducting concentrated brine salt washing, conducting fresh water salt washing, operating and maintaining salt washing equipment and collecting salt samples.

**Summary of Learning Outcomes**

1. Conduct concentrated brine salt washing
2. Conduct fresh water salt washing
3. Maintain salt washing equipment
4. Collect salt samples

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct concentrated brine salt washing | * Terms and concepts * Washing equipment * Brine concentration calculations * Safety procedures and regulations * Washing process * Brine discharge | * Observation * Oral questioning * Written tests * Practical |
| 1. Conduct fresh water salt washing | * Terms and concepts * Washing equipment * Brine concentration calculations * Safety procedures and regulations * Washing process * Waste water discharge | * Observation * Oral questioning * Practical |
| 1. Operate and maintain salt washing equipment | * Terms and concepts * Salt washing equipment * Equipment defects * Operation and Maintenance of equipment | * Observation * Practical * Oral questioning * Written tests |
| 1. Collect salt samples | * Sample point identification * Sample collection * Recording of sample data * Management of sample data | * Practical * Written tests * Presentation * Oral questioning * Assignment |

**Suggested methods of Instruction**

* Facilitation of theory by trainer
* Demonstration of task by trainer
* Practice by trainee
* Industrial visits

**Recommended Resources**

* Washing equipment
* Personal Protective Equipment
* White board
* Projector
* Computer
* Internet connectivity
* Vacuum evaporators
* Conveyor belt
* Grainer
* Reference materials
* Computers
* Stationery

# SALT DRYING

**UNIT CODE:** MIN/CU/SP/CR/03/4/A

**Relationship to Occupational Standards**

This unit of learning addresses the unit of competency: perform salt drying.

**Duration of Unit: 50** hours

**Unit Description**

This unit specifies competencies required to perform salt drying. It entails scheduling salt drying operations, monitoring salt stockpiles, operating salt drying equipment and collecting salt samples.

**Summary of Learning Outcomes**

1. Schedule salt drying operations
2. Monitor salt stockpiles
3. Operate salt drying equipment
4. Collect salt samples

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Schedule salt drying operations | * Terms And Concepts * Salt drying equipment * Salt drying procedures * PPEs * Sun drying * Equipment maintenance schedule | * Observation * Oral questioning * Written tests * Practicals |
| 1. Monitor salt stockpiles | * Terms and concepts * Physical properties of salt * Stockpile volume calculations * Stability of stockpiles * Monitoring salt moisture content * Management of stockpiles records | * Observation * Product checklist * Oral questioning * Practicals |
| 1. Operate salt drying equipment | * Terms and concepts * Drying equipment * Basic mechanics operations and maintenance * Operate salt drying equipment * Safety procedures when handling drying equipment * Drying equipment maintenance | * Observation * Oral questioning * Written tests * Practicals |
| 1. Collect salt samples | * Sample point identification * Sample collection * Recording of sample data * Management of sample data | * Observation * Oral questioning * Written tests * Practicals |

**Suggested methods of Instruction**

* Fieldtrips
* Facilitation of theory by trainer
* Demonstration of task by trainer
* Practice by trainee

**Recommended Resources**

* Personal Protective Equipment
* Computers
* Grainer
* Vacuum evaporator
* Rotary drier
* Salt vibration fluid bed drier
* Stationery
* White board
* Reference materials

# SALT GRINDING

**UNIT CODE:** MIN/CU/SP/CR/04/4/A

**Relationship to Occupational Standards**

This unit of learning addresses the unit of competency: perform salt grinding.

**Duration of Unit: 80** hours

**Unit Description**

This unit specifies competencies required to perform salt grinding. It entails scheduling salt grinding operations, operating salt grinding equipment, performing screening and salt grading operations. It also includes collecting salt samples.

**Summary of Learning Outcomes**

1. Schedule salt grinding operations
2. Operate salt grinding equipment
3. Perform screening operations
4. Perform salt grading operation
5. Collect salt samples

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Schedule salt grinding operations | * Terms and concepts * Grinding equipment * Grinding procedures * Maintenance schedule * PPEs | * Observation * Practical * Written tests * Assignment |
| 1. Operate salt grinding equipment | * Grinding equipment * Safety procedures when handling equipment * Operating grinding equipment * Physical properties of salt * Maintenance of equipment | * Observation * Practical * Written tests * Assignments |
| 1. Perform screening operations | * Types of screens * Screening procedure * Screening analysis * Safety procedures in screening * Screen maintenance | * Observation * Practical * Written tests * Assignments |
| 1. Perform salt grading operation | * Terms and concepts * Application of salt * Salt additives * Salt particle sizes * Purity of salt * Salt grading * Maintaining grading records | * Observation * Practical * Written tests * Assignment |
| 1. Collect salt samples | * Sample identification * Sample collection * Recording of sample data * Management of sample data | * Observation * Practical * Written tests * Assignment |

**Suggested methods of Instruction**

* Facilitation of theory by trainer
* Demonstration of task by trainer
* Practice by trainee
* Viewing videos
* Industrial visits

**Recommended Resources**

* Personal Protective Equipment
* Computer
* Additives
* Reference materials
* Screens
* Salt grinding machine
* Salt milling machine
* Pulveriser
* Internet connectivity

# SALT PACKAGING

**UNIT CODE:** MIN/CU/SP/CR/05/4/A

**Relationship to Occupational Standards**

This unit of learning addresses the unit of competency: perform salt packaging

**Duration of Unit: 60** hours

**Unit Description**

This unit specifies competencies required to perform salt packaging. It entails scheduling packaging and bagging operations, performing salt sorting and performing salt bagging and packaging operations.

**Summary of Learning Outcomes**

1. Schedule packaging operations
2. Perform salt sorting operations
3. Operate salt packaging equipment
4. Perform salt bagging operation
5. Perform bag labelling

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Schedule packaging operations | * Terms and concepts * Packaging and bagging equipment * PPEs * Packaging and bagging procedure * Equipment maintenance scheduling | * Observation * Practical * Written tests * Assignments |
| 1. Perform salt sorting operations | * Terms and concepts * Salt additives * Salt particle sizes * Purity of salt * Application of salt * Salt grades * Sorting procedure | * Observation * Written test * Practicals * Assignments |
| 1. Perform salt bagging and packaging operation | * Bagging and packaging equipment * Bagging and packaging materials * Labelling equipment * Bagging and packaging procedure * Labelling procedures * Safety procedures * Management of packaging and bagging records | * Observation * Written tests * Practical * Assignment |

**Suggested methods of Instruction**

* Trainer led facilitation
* Demonstration of task by trainer
* Practice by trainee
* Field visits
* Viewing videos

**Recommended Resources**

* Personal Protective Equipment
* Bagging and packaging equipment
* Salt bags
* Salt sachets
* Reference materials
* PPEs
* Computers
* Internet connectivity
* Workshops
* Reference materials