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**CONTENTS • INHOUD***No.**Page  
No.    Gazette  
      No.***GOVERNMENT NOTICES****South African Qualifications Authority***Government Notices*

617	National Standards Bodies Regulations: Standards Generating Body (SGB) for Printing and Packaging registered by Organising Field 06, Manufacturing, Engineering and Technology .....	3	28473
618	do.: Standards Generating Body (SGB) for Mining and Minerals registered by Organising Field 06, Manufacturing, Engineering and Technology.....	16	28473

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## GOVERNMENT NOTICES

## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 617

23 June 2006



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

**Printing and Packaging**

Registered by Organising Field 06, Manufacturing, Engineering and Technology, publishes the following qualification for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification. The qualification can be accessed via the SAQA web-site at [www.saqqa.org.za](http://www.saqqa.org.za). Copies may also be obtained from the Directorate for Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification should reach SAQA at the address *below and no later than 20 July 2006*. All correspondence should be marked **Standards Setting – SGB for Printing and Packaging** and addressed to

The Director: Standards Setting and Development  
SAQA

*Attention: Mr. D Mphuthing*

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DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## QUALIFICATION:

*National Certificate: Printing and Manufacture of Packaging*

SAQA QUAL ID	QUALIFICATION TITLE		
57122	National Certificate: Printing and Manufacture of Packaging		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Printing and Packaging	6		
QUAL TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD	
National Certificate	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	141	Level 5	Regular-Unit Stds Based

**PURPOSE AND RATIONALE OF THE QUALIFICATION**

## Purpose:

This qualification will equip the individual with the skills, knowledge and values to participate effectively in workplace activities within the printing and packaging manufacturing industries. Learners achieving this qualification will be able to contribute to printing and packaging manufacturing processes by:

- > Maintaining and improving processes and systems.
- > Implementing new products, materials or technology.
- > Managing the production environment and develop the workgroup.

Qualifying learners will also be able to relate what they learn and experience to scientific and technological principles and concepts. They will also understand how they should operate within the systems which govern their workplace. What learners achieve through this qualification will also serve as a basis for further learning in which they will optimise processes and introduce new technology.

The skills, knowledge and values demonstrated within this qualification will ensure that workers and new entrants will acquire relevant skills and knowledge required by a fast-changing sector essential for economic growth and transformation. This qualification will contribute to the social upliftment of employees and economic growth within the printing and packaging manufacturing environment by allowing learners who are active in the industry to gain recognition for the skills and knowledge they have acquired without having to go through a formal apprenticeship process. Small printing and packaging manufacturing enterprises would also be ideal vehicles for Black Economic Empowerment.

## Rationale:

This is the fourth in a series of four qualifications in a learning pathway for high-volume printing and packaging manufacturing processes. The trade or occupation, however, is pegged at NQF Level 4. Further career development after NQF 5 would be based on choices relating to the learner's aspirations:

- > Entrepreneurial activities (starting own business).
- > General or technical management.
- > Quality management.
- > Conceptual design of printing and packaging materials.
- > Advanced technology.

This qualification series recognises skills, knowledge and values relevant to a workplace. It is designed for learners who engage actively in printing and packaging manufacturing processes. It is suitable for learners who:

- > Attend courses and then apply the knowledge gained to activities in the workplace (Portfolio to reflect formative assessment).
- > Are already workers and have acquired the skills and knowledge without attending formal courses (RPL can be done through the summative assessment and portfolio of evidence).
- > Participate in skills programmes and have the appropriate work experience.
- > Are part of a learnership programme which integrates structured learning and work experience.
- > Acquire their learning through any combination of the above.

The outcomes of this qualification combine skills and knowledge in the technical, inter-personal and business spheres, enabling the learner to perform the operational aspects of the work, function within a team context and contribute to value-adding processes in the business.

The value of the occupation will benefit society and the economy. The printing and packaging manufacturing industries are essential to the supply of a wide range of processed and manufactured products, from foodstuffs to pharmaceuticals, to the consumer. These industries are also vital to the country's export markets. Printing also provides society with reading matter in a wide variety of forms from leaflets and advertising to magazines, newspapers and books. This qualification also emphasises the learner's role in conserving resources and behaving responsibly towards the environment in general.

This qualification will contribute to the full development of the learner by providing recognition for skills and knowledge achieved, thereby forming the basis of further advancement in the occupation and further mobility and transportability across the various sectors of the printing and packaging manufacturing industries.

This qualification and the related qualifications in this series replace a number of legacy qualifications for various trades and occupations in the printing and manufacture of packaging industries.

These industries are currently also undergoing significant change. These changes include:

- > Changes in machine design.
- > A shift from film and other media to digital imaging, processing and printing.
- > A shift from hand skills to conceptual skills.
- > Greater global competition and higher standards required for products designed to be exported.
- > More exacting requirements from customers and consumers.

These changes require that these trades and occupations also need to be re-conceptualised, incorporating new skills and knowledge to replace outdated skills and knowledge. This has to be done in a sensitive fashion because some sites continue to require, at least in part, some of the traditional skills and knowledge.

This and the associated qualifications in the series provide a developmental pathway for the full range of activities related to the occupation, from those of the operator of simple equipment for printing and the manufacture of packaging, to those of the tradesperson with several years' experience, a higher level of technical knowledge and the ability to integrate new technology, materials and processes into existing operations.

The industries have to respond to environmental issues and the on-going development of new products as a result of changing customer needs. Printing and packaging products have to respond to a wide variety of exacting customer and consumer requirements.

This qualification describes the skills and knowledge required in a generic manner so that the changing needs of particular work sites can be met. The learner will acquire skills, competencies and knowledge in the following:

Printing:

- > Letterpress.
- > Screen printing.
- > Flexography.
- > Gravure.
- > Lithography.
- > Continuous stationery.
- > Roll label.
- > Rotary offset.

Manufacture of packaging, with or without in-line printing processes:

- > Bag making.

- > Sack making.
- > Carton making.
- > Can and end making.
- > Laminating.
- > Coating.
- > Corrugated board manufacturing.
- > Tubing.
- > Wrapping.
- > Over printing.
- > Envelope making.
- > File manufacturing.

Typical learners would have qualified in, and have acquired some experience of, a trade or occupation in the printing or manufacture of packaging fields.

#### **RECOGNIZE PREVIOUS LEARNING?**

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#### **LEARNING ASSUMED TO BE IN PLACE**

It is assumed that learners are already competent in:

- > Communication and Mathematical Literacy at NQF Level 4.

Recognition of prior learning:

This qualification may be obtained through a process of RPL. The learner should be thoroughly briefed prior to the assessment and support should be provided to assist the learner in the process of developing a portfolio. The guidelines for integrated assessment should be used to develop the RPL assessment process. As with integrated assessment, while this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the Exit Level Outcomes.

Access to the qualification:

Access to this qualification is open bearing in mind learning assumed to be in place.

#### **QUALIFICATION RULES**

The rules of combination for this qualification are reflected in the matrix.

- > The total number of credits for this qualification is 141.
- > The total number of credits in the Fundamental component is 32.
- > The total number of credits in the Core component is 95.
- > The minimum number of Elective credits is 14.

#### **EXIT LEVEL OUTCOMES**

The Exit Level Outcomes for this qualification reflect a combination of Specific Outcomes and Critical Cross-field Education and Training Outcomes. The way in which the Critical Outcomes have been advanced through the learning required for this qualification is embedded in the way in which the unit standards have been constructed. Critical Outcomes form the basis for acquiring the skills and knowledge and values. The application of these in a specific context results in the achievement of Specific Outcomes. The integration of Specific Outcomes from a variety of unit standards results in the ability to achieve the Exit Level Outcomes.

1. Maintain and improve printing or packaging processes and systems.
2. Enforce, monitor, and improve systems relating to budgets.
3. Optimise processes, introduce and integrate upgraded products, equipment and materials and enhanced technology in response to changing requirements.
  - > Range: Requirements could be customer, technology, increased demand, new regulations, cost savings, safety, health or environmental requirements.
4. Plan and schedule work and resolve problems related to the production process.
  - > Range: Includes knowledge of basic management principles, legislation, especially labour related legislation.
5. Mentor and develop the workgroup and workgroup members.

Critical Cross-field Outcomes:

These are embedded in the unit standards which make up the qualification and are thus also reflected in the Exit Level Outcomes of the qualification.

The Critical Cross-Field Outcomes are supported by the Exit Level Outcomes as follows:

1. Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.  
> Refer to Exit Level Outcomes 1, 2, 4, 5.
2. Working effectively with others as a member of a team, group, organization and community.  
> Refer to Exit Level Outcomes 1,2, 3, 4, 5.
3. Organising and managing oneself and one's activities responsibly and effectively.  
> Refer to Exit Level Outcomes 1, 2, 3, 4, 5.
4. Collecting, analyzing, organizing and critically evaluating information.  
> Refer to Exit Level Outcomes 1, 2, 3, 4, 5.
5. Communicating effectively using visual, mathematical and/or language skills.  
> Refer to Exit Level Outcomes 1, 2, 3, 4, 5.
6. Using science and technology effectively and critically, showing responsibility toward the environment and health of others.  
> Refer to Exit Level Outcomes 1, 2, 3.
7. Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation.  
> Refer to Exit Level Outcomes 1, 2, 3, 4.

#### **ASSOCIATED ASSESSMENT CRITERIA**

1.  
> Current efficiencies on the printing and packaging process are maintained in accordance with set organisational quality standards.  
> Problems are anticipated and resolved in accordance with organisational procedures.  
> Information on the production process is collected, summarised, and analysed for potential problems.  
> Changes or recommendations are made relative to the systematic analysis and the effects of implementation are recorded and reported in accordance with organisational requirements.  
> Safety, health, environmental and quality requirements are adhered to at all times in the printing or packaging process.
2.  
> Changes in the technology and markets are evaluated and their potential impact on operations is evaluated in accordance with standards.  
> Budgets are developed, expenditure monitored variations reported and discussed in accordance with standards.  
> Range: Understanding of budgets, budget control and cost reports.  
> Implementation and progress are evaluated and reported in accordance with procedures.
3.  
> The products, equipment and materials are produced in accordance with the planned design requirements.  
> Enhanced technology is implemented in accordance with work related standards.  
> The impact of innovations is discussed in relation to the underlying technology and principles.
4.  
> Production schedules are efficient and are documented in accordance with procedures.  
> Range: Prioritisation, effective resource utilisation.  
> Progress is monitored, measured and recorded in accordance with procedures.  
> Effectiveness and efficiency of process and the use of resources are tracked and evaluated in accordance with set standards.  
> Problems are identified, resolved and documented in accordance with procedures.
5.  
> Problems relating to the workgroup or individuals in the workgroup are identified and resolved in accordance with standards.  
> Interventions to support, train and motivate workgroup members are planned and implemented in

accordance with requirements.

- > Interventions to support, train and motivate workgroup members are evaluated in accordance with requirements.
- > Workgroup members' progress is evaluated in accordance with organisational procedures.

Integrated Assessment:

The integrated assessment should be based on a summative assessment guide. The guide will specify how the assessor will assess different aspects of the performance and will include:

- > Evaluating evidence in a portfolio of evidence, particularly projects which integrate various aspects of the qualification and which demonstrate the integration of all aspects of learning: fundamental and core; knowledge, skills and values; the development of the critical outcomes.
- > Observing and listening to the learner at work, both in primary activities as well as in other interactions, or in relevant simulations.
- > Asking questions and initiating short discussions to test understanding and to verify other evidence.
- > Looking at records and reports.
- > Formative and summative assessment of unit standards.

Assessment of competence for this qualification is based on experience acquired by the learner in the workplace, within the particular printing of packaging manufacturing context. The assessment process should cover the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the management process. The assessment process should also establish how the learning process has advanced the Critical Cross-field Outcomes.

The learner may choose in which language he/she wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be presented if pertinent to any of the Exit Level Outcomes.

Assessors should also evaluate evidence that the learner has been, and is, able to perform consistently over a period of time.

### **INTERNATIONAL COMPARABILITY**

Introduction:

This study incorporates an electronic search across continents for standards, trends and structure of courses in the Printing and Packaging fields. Information on industry and trade standards, curricular and syllabi from academic and industry training institutions available was compared. The depth of the search went as far as Nigeria from which a report into the industrial sectors of Nigeria led the study to the conclusion that the print and packaging industry was in its infancy stage and almost completely dependent on imports and foreign companies, implying that skills development in the sector is at best dependent on imported courses and industry training standards.

Other sub-Saharan countries reviewed included Ghana, Kenya, Malawi, Mauritius and Tanzania where a similar situation of an emerging printing and packaging sector heavily dependent on imported industry standards and accompanying education and training packages is evident. Many training initiatives are being supported by foreign donor-funding, for example, Ghana where the Regional African Development Project has been working with the emerging printing and packaging sector for a number of years to transfer skills and capacitate emerging printing and packaging companies. Moves to establish a regional printing and packaging association able to set industry standards and collaborate on training and skills development are occurring in East Africa with Tanzania hosting regional conferences for the emerging printing and packaging industry on an annual basis.

In the main, it seems that the emergence and need for industry standards and concomitant development of training courses and programmes is related to demands associated with exports and penetration of global markets, particularly in respect of packaging for processed foods (health and safety issues) as well as waste packaging (environmental issues).

Of the developing economies in the world, India is particularly advanced in the sector as far as training and development is concerned with courses offered ranging from certificate level of 3 month duration to Masters in Business Administration with a specialization in printing and packaging. The prospectus from one institution emphasizes the need for this specialization in training mentioning the important contribution of

packaging and printing to export and marketing which is a direct contributor to the growth of their economy. Information on the content of printing trades and crafts in India does not reveal much information, except for those associated with the development of handcrafts and the announcement of a new printing trade for desktop publishing operator. It would seem that the printing trades have not changed significantly.

Of the countries with established qualifications frameworks, information from institutions in Australia, Ireland, New Zealand, England-Wales and Scotland was sought and found to be very informative in this context.

Of particular note is Australia, where a new set of training course standards were published during October 2005. This allowed the SGB to compare their perception of new trends with those of another country.

1. In addition, as preparation for the development process some of the SGB members reviewed the 'bible' of printing the Handbook of Print Media - Technologies and Production Methods, edited by Prof. Dr.-Ing. habil. Helmut Kipphan for the Heidelberger Druckmaschinen AG, one of the best-known names amongst printing equipment manufacturers.

Comparison:

Kipphan and his fellow writers note that changing technology is impacting dramatically on the nature of equipment and the type of work that is being done. Traditional photolithography and all the skills associated with film have given way to digital computer-to-plate and computer-to-press processes. In addition new non-impact printing processes such as laser and ink jet have also changed the type and nature of printed products. New substrates are also influencing the printing and packaging processes. This is leading to the "one-man press" working environment, where one person will now do what was the work of a team previously. He goes on to note:

Printing processes are being increasingly controlled and adjusted electronically, which leads to consistent high quality and greater productivity. Digital workflow also means that productions are completed more rapidly. Hence more than half of the orders for commercial printers arrive in digital form. By the year 2002 this figure is expected to be over 65%. This is the only way of shortening delivery times for print products and meeting the high customer demand for quality. All printing companies are expected to offer greater flexibility in the processing of a large variety of substrates, inks, and methods of print finishing. This means that there is a visible trend for all print products to employ multicolor as well as decorative and special colors. In addition, run lengths are getting shorter since experts believe that the greatest chance of growth lies in the market for small, color work with a fast turnaround time.

Finally hard copy is slowly giving way or being augmented by multi-media, digital products such as CDs and the World Wide Web. While Kipphan expects these to impact on traditional print media he does not expect them to be replaced by digital multi-media.

These developments have a clear impact on the type and nature of the training that people in the printing and packaging industry will undergo. A survey of qualifications, standards, courses, apprenticeships, occupational outlooks and industry websites reveals changes taking place but at an uneven and inconclusive way. Some of these issues are discussed below.

In the study it was clear that the structure and duration of courses would differ from the outcomes-based standards based on applied competence designed for South Africa, since their credit systems and syllabi differs in so far as knowledge acquisition and practical training is concerned. Many of the courses are particularly designed for the vocational context especially in Australia, Ireland, England and Scotland. The Lead Employer Council for Printing and Packaging in the United Kingdom, the British Printing Industries Federation, has adopted the Scottish-National Vocational Qualifications (S/NVQs) as the training and development framework and learning achievement outcomes for their industry sector. This suggests that the quality of the Scottish solution is a clear benchmark implication.

Countries with outcomes based systems still remain the best source of information when doing this research. Hence we have drawn a comparison between South Africa, Australia, Ireland, New Zealand, Scotland (and the UK). There is insufficient information on printing apprenticeships in other countries to make valid comparisons in the same way. The following indicates the broad fit of the proposed qualifications into overseas schemes.

Australia:

- > Programmes designed toward industry needs.
- > Programmes include broader knowledge base for personal development, including customer relations and innovation.



- > Programme structure consists of fundamental and core and referred to as compulsory and a group of electives. Elective = 40% of programme.
- > Modules are industry process specific broadening on communication, health and safety, customer orientation and business skills.
- > Almost 70% of programme is based in industry.
- > Certificates, Diplomas, Advanced Diplomas and Degrees in Printing and Packaging.

## Ireland:

- > Programmes designed towards industry needs.
- > Programmes specific to occupation or tasks associated with job competence or specific skills certificates.
- > Programme structure determined by specific skill set.
- > Modules are industry process specific.
- > Awards for acquisition of skills sets at 4 levels on the Awards Framework (levels 3, 4, 5 and 6).

## New Zealand:

- > Programmes designed towards industry needs.
- > Programmes include broader knowledge.
- > Modules are industry process specific broadening on communication, health and safety.
- > National Certificates at levels 2, 3 and 4.

## Scotland and UK:

- > Programmes designed towards industry needs.
- > Programmes specific to occupation and include education and training and self-development.
- > Programme structure consists of mandatory common and technical and a small group of options - 2 technical and 1 general with a strong skills development focus. Optional = 27%.
- > Modules are industry process specific and include self and other development in the optional choices.
- > S/NVQ qualifications at levels 2 and 3.

## South Africa:

- > Programmes designed toward industry and occupational needs.
- > Programmes include broader knowledge for lifelong learning and personal development.
- > Electives = 10%.
- > Unit standards based on a combination of fundamental and core which is a mix of the other approaches.
- > Certificates and Diplomas.

The following section details some examples of the structure of printing and packaging qualification's in other countries.

## Australian Printing Qualification:

## Cert I Pre-Vocational Printing 7793:

The program structure below was last updated on 13/09/2005.

- > Compulsory Courses Group A.
- Select 6 Courses:

## Name:

- > Ncs001 Workplace Communication: 40 credits.
- > Work Environ - Print Ind: 40 credits.
- > O H & Safety PV1: 10 credits.
- > Intro - Computers - G Arts PV1: 40 credits.
- > Intro To Electronic Printing: 10 credits.
- > Industry Visits PV1: 20 credits.

- > Model 1 (Press) Compulsory Courses Group A.
- Select 5 Courses:

## Name: Credits

- > Print Machine & Material Product Support 1: 40 credits.

- > Print Machine Wash Up & Maintain: 40 credits.
- > Sheet-Fed Litho 1 (PV1): 40 credits.
- > Guillotining 1 (PV1): 20 credits.
- > Packaging And Dispatch: 20 credits.

> Model 1 (Press) Elective Courses Group A.  
Select 3 Courses:

Name: Credits

- > Man Combin 1 (Mon/Bas Col): 40 credits.
- > Litho Platemaking & Step & Repeat: 40 credits.
- > Hand Binding And Finishing PV1: 40 credits.

> Model 2 (Prepress) Compulsory Courses Group A.  
Select 3 Courses:

Name: Credits

- > Print Processes And Materials: 40 credits.
- > Packaging And Dispatch: 20 credits.
- > Guillotining 1 (PV1): 20 credits.

> Model 2 (Prepress) Elective Courses Group A.  
Select 5 Courses:

Name: Credits

- > Typography 1: 40 credits.
- > Scanning 1: 40 credits.
- > Image Output Electronic: 40 credits.
- > Electronic Image Assembly 1: 40 credits.
- > Colour Theory and Proofing: 40 credits.

Scottish National Vocational Qualification example: Level 3

Desktop Publishing - Level 3 - Overview

> Mandatory Common Units:

- > 001: Reduce risks to health and safety in your workplace.
- > 002: Develop yourself in your job.

> Mandatory Technical Units:

- > 705: Plan datafile production.
- > 706: Create and apply typographical specifications to meet customer requirements.
- > 305IT: Design and produce documents using word processing software (IT).
- > 312IT: Design and produce documents using graphics (IT/NTO).
- > 302IT: Maintain the software environment (IT/NTO).
- > 3CS: Develop customer relationships (ICS).

> Optional Technical Units (Choose 2):

- > 707: Calibrate and control colour in Desk Top publishing.
- > 708: Produce aeronautical documentation.
- > 709: Produce graphical representations of aeronautical spatial data.
- > 33D: Develop and present suitable design responses (SFEDI).
- > 34D: Produce and present detailed design proposals (SFEDI).
- > 212IT: Maintain and use databases (IT/NTO).

> General Optional Unit (Choose 1):

- > B1: Support the efficient use of resources (MCI).
- > C1: Manage yourself (MCI).
- > C9: Contribute to the development of teams and individuals (MCI).

- > C12: Lead the work of teams and individuals to achieve their objectives (MCI).
- > D32: Assess candidate performance (ENTO).
- > C24: Facilitate learning through demonstration and instruction (ENTO).
- > C25: Facilitate individual learning through coaching (ENTO).
- > 005: Train new operators.

> Mandatory Common Units:

- > 001: Reduce risks to health and safety in your workplace.
- > 002: Develop yourself in your job.

> Mandatory Technical Units:

- > 705: Plan datafile production.
- > 706: Create and apply typographical specifications to meet customer requirements.
- > 305IT: Design and produce documents using word processing software (IT).

The above examples demonstrate the shift to IT skills, team - and customer relationships, digital workflows and the development of skills in others.

Apprenticeship:

In general, training for printing and the manufacture of packaging occupations is still traditionally done through apprenticeships even where other system occur. Countries which have apprenticeships from the countries surveyed include the UK, German, the United States, India, Australia.

Apprenticeships follow a fairly similar pattern. They last approximately three years, they comprise a combination of theory and practice in a ratio of approximately 1:2. The theory component also includes broader business and quality. Latterly however, some have been stretched to include broader issues such environment, entrepreneurship and information technology subjects or topics.

Apprenticeships, in general, are aimed at particular printing techniques and processes, although there are now indications, eg in Germany, where the range of trade qualifications is being reduced to four core processes:

1. Flexography
2. Gravure
3. Lithography
4. Digital

One apprenticeship surveyed ( in Switzerland) stretches into a fourth year and includes great emphasis on quality, troubleshooting, safety and environmental systems and practices as well as greater technical ability in terms of pre-press and print process including issues related to efficiency, productivity and lean manufacturing.

Some apprenticeships are shorter than this norm, ef screen printing handicraft apprenticeships in India last 6 months and include:

1. Basic training of one week.
2. Practical trade training.
3. Trade theory.

Screen printing on, for instance, tee shirts lends itself to entrepreneurship. Hence this apprenticeship is really aimed at SME-Development.

Many countries also include in their occupational profile printing assistances or operators who have not formally been through an apprenticeship and have learned largely on-the-job.

In a number of countries (eg India, Germany, Australia) there is now a new trade qualification emerging, one for digital printing. The impact of information technology has also meant a change in the way people work and the demise of old trade qualifications such as photo lithographer.

Apart from the changes to training courses the delivery of new equipment into companies also affects that nature and type of skills required by practitioner. Computer technology has also affected the control systems of printing and packaging equipment. The impact of this still lies, to large extent, in the future.

## Conclusion

The South African qualifications developed for printing and packing had taken the above factors into account and informed the development of the printing and manufacture of packaging qualifications, sourcing of the relevant unit standards and where applicable at NQF levels 2 to 4, best practice identified above informed the development of relevant unit standards. The qualifications and standards have been constructed to be:

1. Flexible in terms of levels and include options for both apprentices as well as those who advance more slowly.
2. Generic so that they can be applied to any printing and packing process.
3. Future-orientated so that the qualifications do not have to be revised frequently as technology changes.
4. Skill-based so that those who still interface with older equipment are not marginalized.
5. Linked to business drivers such as global competition, cost reduction, environmental impact, SMME development as well as recognition of prior learning.
6. Broad skills sets, not only for printing and packaging but also for team building, customer handling, coaching, mentoring and assessing.
7. Stretches beyond the traditional craft or trade qualification to include advanced technical skills as well as the basics of production and business management skills.

The South African qualifications measure up well in terms of the above trends to the recently revised printing qualifications developed in Australia.

## Resources:

All websites were visited between 1 April and 30 November 2005.

Kipphan, Helmut ed, 2001. Handbook of print media : technologies and production methods Berlin: Springer

## Websites:

### Germany:

> <http://infobub.arbeitsagentur.de/berufe/start?dest=profession&prof-id=1495>

### India:

- > <http://texmin.nic.in/annualrep/arch09.htm>
- > <http://www.tn.gov.in/gorders/labemp-e-66-2003.htm>
- > <http://dget.nic.in/lisdapp/Trade/syllabus/pdf/TTSCR.pdf>
- > <http://yavatmal.nic.in/ITI.htm>

### Ireland:

> [http://www.ncva.ie/exist\\_legacy\\_awards](http://www.ncva.ie/exist_legacy_awards)

### Switzerland:

> [http://www.bbt.admin.ch/berufsbi/bildungse/d/34117\\_d.pdf](http://www.bbt.admin.ch/berufsbi/bildungse/d/34117_d.pdf)

### UK:

>

- <http://www.apprenticeships.org.uk/list/apprenticeshipsdirectory/mediaandprinting/printandprintpackaging.htm>
- > <http://www.printnto.org/> (presently under re-construction)
- > [http://www.petf.org.uk/content\\_nvq](http://www.petf.org.uk/content_nvq)
- > <http://www.britishprint.com/training/nvqpathways.asp>

### USA:

- > <http://www.bls.gov/oco/ocos231.htm>
- > <http://www.gciu.org>
- > <http://www.gatf.org>
- > <http://www.ncssgc.org/>

## ARTICULATION OPTIONS

This qualification articulates vertically with National Diploma in Master Craftsmanship: NQF Level 5, 49059 and

National Certificate in Manufacturing Management: NQF Level 5, 49743.

#### MODERATION OPTIONS

- > Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with an appropriate Education and Training Quality Assurance Body (ETQA) or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.
- > Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.
- > Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.
- > Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

#### CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

- > Appropriate qualification with a minimum of 3 years' experience of a relevant process of printing or packaging manufacture.
- > Registration as an assessor with a relevant ETQA.

#### NOTES

N/A

#### UNIT STANDARDS

(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	14586 Monitor and control quality control practices in a manufacturing/engineering environment	Level 4	8	Registered
Core	9904 Coordinate work group to produce product	Level 5	8	Reregistered
Core	15223 Implement training needs for teams and individuals to upgrade skills levels	Level 5	3	Reregistered
Core	116778 Develop quality plans and ensure overall quality of products or services in a small business or business unit	Level 5	10	Registered
Core	116782 Control logistical flow of components and materials	Level 5	8	Registered
Core	116790 Commission machines and equipment or pilot and test a new technical service	Level 5	10	Registered
Core	117701 Address safety, health and environmental requirements and hazards in a technical context	Level 5	8	Registered
Core	119159 Maintain plastics manufacturing efficiencies	Level 5	12	Registered
Core	119166 Optimise plastics manufacturing processes	Level 5	24	Registered
Core	119180 Schedule and arrange maintenance and repairs for plastics manufacturing operations	Level 5	4	Registered
Elective	10327 Provide coaching to personnel within a Contact Centre	Level 4	10	Reregistered
Elective	114880 Measure and improve single factor productivity at a work station	Level 4	8	Registered
Elective	9224 Implement policies regarding HIV/AIDS in the workplace	Level 5	4	Reregistered
Elective	9406 Manage a team	Level 5	4	Registered
Elective	9897 Manage inventory	Level 5	3	Registered
Elective	10147 Supervise a project team of a technical project to deliver project objectives	Level 5	14	Reregistered
Elective	12458 Develop the skills of a work team	Level 5	10	Registered
Elective	12459 Optimise the safety, health and environmental protection system	Level 5	6	Registered
Elective	13203 Counsel workgroup members in respect of HIV/AIDS	Level 5	3	Registered
Elective	13237 Optimise the quality assurance system	Level 5	6	Reregistered
Elective	15234 Apply efficient time management to the work of a department/division/section	Level 5	4	Reregistered
Elective	15235 Prepare and conduct staff selection interviews	Level 5	3	Reregistered

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Elective	116786	Manage the cash flow of a small business or a business unit	Level 5	10	Registered
Elective	116793	Determine the viability of a business and monitor its performance	Level 5	10	Registered
Elective	117874	Guide learners about their learning, assessment and recognition opportunities	Level 5	6	Registered
Elective	119150	Co-ordinate the installation of plastics manufacturing and related equipment	Level 5	10	Registered
Elective	119163	Conduct tooling, material or equipment trials in plastics manufacturing processes	Level 5	12	Registered
Elective	119168	Order and ensure delivery from external suppliers for plastics manufacturing processes	Level 5	4	Registered
Elective	119170	Plan, schedule and monitor plastics production	Level 5	8	Registered
Elective	119183	Test and evaluate the quality of plastics raw materials and finished products	Level 5	10	Registered
Fundamental	12432	Use mathematical and statistical techniques effectively	Level 5	20	Registered
Fundamental	12433	Use communication techniques effectively	Level 5	8	Registered
Fundamental	15225	Identify and interpret related legislation and its impact on the team, department or division and ensure compliance	Level 5	4	Reregistered

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### SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

#### Mining and Minerals

Registered by Organising Field 06, Manufacturing, Engineering and Technology, publishes the following qualification and unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification and unit standards. The qualification and unit standards can be accessed via the SAQA web-site at [www.saga.org.za](http://www.saga.org.za). Copies may also be obtained from the Directorate for Standards Setting and Development at the SAQA offices, **Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.**

Comment on the qualification and unit standards should reach SAQA at the address ***below and no later than 20 July 2006.*** All correspondence should be marked **Standards Setting – SGB for Mining and Minerals** and addressed to

The Director: Standards Setting and Development  
SAQA

*Attention: Mr. D Mphuthing*

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: [dmphuthing@saga.co.za](mailto:dmphuthing@saga.co.za)

S BHIKHA

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## QUALIFICATION:

**National Certificate: Rockbreaking: Quarrying**

SAQA QUAL ID	QUALIFICATION TITLE		
57121	National Certificate: Rockbreaking: Quarrying		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
QUAL TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD	
National Certificate	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	160	Level 3	Regular-Unit Stds Based

**PURPOSE AND RATIONALE OF THE QUALIFICATION**

## Purpose:

This qualification will allow a learner in the mining and minerals industry to obtain a nationally recognised qualification in rockbreaking in the areas of quarries and/or dimension stone. It will also contribute to the upliftment of the mining industry and will set a standard for professionalism in the industry. The attainment of this qualification will also attract and retain quality learners and employees. This qualification will also provide for recognition of prior learning to allow for the recognition of existing and common knowledge and skills that will not only allow a learner to gain credits towards this qualification, but also to move across the different occupational areas.

People credited with this qualification are able to:

- > Communicate effectively in the workplace and a variety of other contexts.
- > Apply mathematical principles in practical applications.
- > Handle, transport and store explosives in quarries and dimension stone operations.
- > Conduct primary and secondary rockbreaking operations in quarries.

## Rationale:

The National Certificate in Rockbreaking (Quarrying) Level 3 is designed to contribute to an effective mining operation, in particular rockbreaking competence in quarries and dimension stone operations.

Persons working in quarry and dimension stone operations require a sound knowledge of the mining and minerals environment and have the capacity to understand mining operations related to quarrying. While the quarrying industry is increasingly making use of outsourcing (external contractors) to conduct rockbreaking activities, there is nevertheless a requirement for companies to have internal skills as well as ensure that the contractor's employees are competent to carry out primary and secondary rockbreaking. Safe and efficient rockbreaking and associated activities are of paramount importance in the quarrying environment. The skills to be obtained through this qualification would also benefit learners at large as it contributes to workplace readiness.

In the Mining and Minerals sector, employees are appointed on technical knowledge (operations), experience and potential supervisory ability.

The National Certificate in Rockbreaking (Quarrying) Level 3 is designed to meet the needs of learners in the Mining and Minerals sector (or those wish to enter the Mining and minerals sector) who require technical expertise and essential knowledge needed to earn a formal qualification in mining operations. The qualification facilitates access from previously disadvantaged groups and other learners to acquire the technical knowledge and skills that are required.



This qualification will enhance the status, productivity and employability of the learner within the mining and minerals industry as well as contribute to the quality, production rate and growth. This allows for access, progression, portability and mobility within and between the different mining operations areas in the mining and minerals industry.

This qualification provides for both primary and secondary rock breaking in quarries in terms of Chapter 4, Explosives Regulations under the Mines Health and Safety Act.

#### **RECOGNIZE PREVIOUS LEARNING?**

Y

#### **LEARNING ASSUMED TO BE IN PLACE**

It is assumed that learners are already competent in:

- > Communication and Mathematical Literacy at NQF Level 2.
- > The unit standard "Demonstrate knowledge of the most common harmful gases and vapours"; level 1, 1 credit SAQA ID 110118.

Recognition of Prior Learning:

This qualification can be achieved wholly or in part through recognition of prior learning in terms of the criteria laid out.

Evidence can be presented in a variety of forms, including international or previous local qualifications, reports, testimonials mentioning functions performed, work records, portfolios, videos of practice and performance records.

All such evidence should be judged according to the general principles of assessment described in the note to assessors.

Access to the Qualification:

Access to this qualification is open bearing in mind learning assumed to be in place.

#### **QUALIFICATION RULES**

This qualification is made up of a planned combination of learning outcomes that have a defined purpose and will provide the qualifying learners with applied competence and a basis for further learning. The qualification is made up of standards that are classified as Fundamental, Core and Electives for the purpose of this qualification.

Fundamental:

- > All 36 credits are compulsory and must be achieved.

Core:

- > All 74 credits are compulsory and must be achieved.

Electives:

- > 50 credits must be chosen as specified below.

For the specialization stream: Quarries

The following 20 credits must be achieved:

- > Drill small diameter blast holes using a drilling rig and compressor L2, C5; SAQA ID - 230020.
- > Blast materials in quarry operations, L3, C15; SAQA ID - 230012.

An additional 30 credits must be chosen from the rest of the electives to make up a minimum of 160 credits to achieve the qualification.

For the specialization stream: Dimension Stone

The following 40 credits must be achieved:

- > Drill holes for blasting and/or splitting dimension stone blocks L2, C3 - 116632.

- > Demonstrate basic understanding of dimension stone geology and mineralogy, L3, C16; SAQA ID - 116627.
- > Demonstrate and apply knowledge of dimension stone quality and geology to block extraction L3, C 21; SAQA ID - 230019.

An additional 10 credits must be chosen from the rest of the electives to make up a minimum of 160 credits to achieve the qualification.

#### **EXIT LEVEL OUTCOMES**

1. Communicate effectively in the workplace and a variety of other contexts.
2. Apply mathematical principles in practical applications.
3. Handle, transport and store explosives in quarries and dimension stone operations.
4. Conduct rockbreaking operations in quarries.
  - > Range: Primary and Secondary rockbreaking.

The following Critical Cross Field Outcomes have been addressed in this qualification:

- > Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.
  - > Equivalent Exit Level Outcome 2.
- > Working effectively with others as a member of a team, group, organization and community.
  - > Equivalent Exit Level Outcome 1.
- > Organising and managing oneself and one's activities responsibly and effectively.
  - > Equivalent Exit Level Outcomes 3, 4.
- > Collecting, analyzing, organizing and critically evaluating information.
  - > Equivalent Exit Level Outcomes 3, 4.
- > Communicating effectively using visual, mathematical and/or language skills.
  - > Equivalent Exit Level Outcomes 1, 2.
- > Using science and technology effectively and critically, showing responsibility toward the environment and health of others.
  - > Equivalent Exit Level Outcome 2.
- > Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation.
  - > Equivalent Exit Level Outcome 2.

#### **ASSOCIATED ASSESSMENT CRITERIA**

1.
  - > Verbal and written communication is used effectively while performing the tasks related to rockbreaking operations in quarries and dimension stone operations and in other related contexts.
  - > Communication skills are used in order to ensure that rockbreaking operations are conducted in accordance with productivity requirements.
2.
  - > Mathematical principles and techniques are applied while performing the tasks related to rockbreaking operations in quarries and dimension stone operations and in other related contexts.
  - > Basic mathematical principles are applied to perform calculations and solve routine problems that occur in the workplace.
3.
  - > Explosives and accessories are handled, transported and stored in accordance with operational requirements.
  - > Safety legislation is understood and complied with during operational activities in accordance with specified requirements.
  - > Occupational Health, Safety and Hygiene requirements are as per workplace requirements.
4.
  - > Marking, drilling and blasting operations are co-ordinated and conducted in quarries in accordance with set standards.
  - > Safety legislation is explained and applied in operational activities in accordance with specified

requirements.

Integrated Assessment:

Integrated assessment at the level of the qualification provides an opportunity for learners to show they are able to integrate concepts, actions and ideas achieved across a range of unit standards and contexts.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance, and must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

- > Observing the learner at work (both in the primary activity as well as other interactions).
- > Asking questions and initiating short discussions to test understanding.
- > Looking at records and reports in the portfolio and reviewing previous assessments.

It is necessary to ensure that the fundamental part of the qualification is also targeted to ensure that while the competence may have been achieved in a particular context, learners are able to apply it in a range of other contexts and for further learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes. The assessment process should cover both the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities associated with the quarrying rockbreaking.

#### **INTERNATIONAL COMPARABILITY**

It was decided to conduct a benchmarking exercise with the following listed countries as their quarrying and mining operational methods are considered world-class. In addition their methods of operation are considered best practice.

- > Australia.
- > The United Kingdom.
- > New Zealand.

It was also considered wise to perform international benchmarking with a country in a similar economic class as South Africa, hence Malaysia was chosen. Furthermore various South African-based organisations conduct quarrying business within Malaysia.

It was prudent to consider educational and training trends within the continent of Africa. Namibia was chosen as a good country to compare this qualification with as many organisations in the sector conduct their business in Namibia.

#### **1. New Zealand - NC in Extractive Industries- (Shotfiring-Surface)**

This New Zealand qualification comprises amongst others the following standards:

- > 8890 - Store explosives for use in extractive industries - Level 4, Credits 10.
- > 8907 - Design blasting layouts within quarries and aggregate production areas Level 4, Credits 20.
- > 8918 - Carry out shot-firing operations - Level 3, Credits 12.

Similar outcomes can be found in this qualification.

#### **2. Australia - Certificate III in Extractive Industries Operations**

In general this qualification and its component unit standards compare well with this Australian qualification. The only major differences are in formatting and scope of coverage or focus.

#### **3. UK - N/SVQ's Shot firing Operations - Quarries**

This qualification contains the following standards:

- > Unit - U1052394 - PR01 - Contribute to an Efficient and Effective Work Environment.
- > Unit - U1052390 - PR02 - Contribute to Health and Safety in the Workplace.
- > Unit - U1053349 - SF3 - Receive, Store and Issue Explosive Materials.
- > Unit - U1053348 - SF4 - Obtain and Transport Explosive Materials.
- > Unit - U1053347 - SF5 - Charge Blast Holes to Specification.
- > Unit - U1053346 - SF6 - Blast to Specification.
- > Unit - U1053345 - SF7 - Deal with Misfires.

Similar outcomes can be found in this qualification.

4.

The African benchmark was done with Namibia. Detailed information on the standards for quarrying rockbreaking was not available to be analysed. However Namibia's Vocational Education and Training (VET) system follows the South African system fairly closely. The training that is provided to learners for workplace readiness in the quarrying field compares very well with the South African Quarrying industry. In fact a substantial number of workers in the Namibian quarrying sector have obtained workplace skills from South Africa where they have received training that is closely linked with the outcomes of this National Certificate being submitted for registration on the NQF.

5.

The Institute of Quarrying in Malaysia (<http://www.iqm.com.my/newpage1.htm>) - is a Branch of the Institute of Quarrying United Kingdom and conducts the following course "training course for shot-firers" that ensures fully qualified, skilful and competent shot-firers officially recognised throughout Malaysia. This course covers the following areas:

- > Receive, Store and Issue Explosive Materials.
- > Obtain and Transport Explosive Materials.
- > Charge Blast Holes to Specification.
- > Blast to Specification.
- > Deal with Misfires.

These unit standards are contained in the National Certificate: Rockbreaking, Level 3. The above deductions indicate that this qualification compares well with those with what it was compared.

#### **ARTICULATION OPTIONS**

This qualification allows for both vertical and horizontal articulation.

Vertical articulation exists with:

- > FETC : Manufacturing and assembly operations supervision; SAQA ID - 48915

Horizontal articulation exists with:

- > National Certificate: Underground Hardrock - Rockbreaking L3; SAQA ID - 49014.

#### **MODERATION OPTIONS**

> Anyone assessing a learner or moderating the assessment of a learner against qualification must be registered as an assessor with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant Education, Training, Quality, Assurance (ETQA) Body, or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

> Moderation must include both internal and external moderation of assessments, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in the

associated Unit Standards.

> Anyone wishing to be assessed against this qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

#### CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors should be in possession of:

- > An appropriate qualification at or above the level of this qualification and preferably relevant workplace practical experience.
- > Registration as an assessor with the relevant ETQA.

#### NOTES

N/A

#### UNIT STANDARDS

(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	115101 Address workplace hazards and risks	Level 2	4	Registered
Core	115514 Handle explosives in a surface mining environment	Level 2	5	Registered
Core	116520 Apply safety, health and environmental principles and procedures in a workplace	Level 2	2	Registered
Core	116533 Demonstrate basic knowledge and understanding of emergency preparedness and response	Level 2	2	Registered
Core	230015 Mark off drill holes for blasting in quarries	Level 2	3	Draft - Prep for P Comment
Core	115507 Examine and make safe non-blasted quarry excavations	Level 3	4	Registered
Core	115535 Examine and make safe blasted quarry excavations	Level 3	5	Registered
Core	115615 Co-ordinate drilling and blasting operations	Level 3	26	Registered
Core	116534 Carry out basic first aid treatment in the workplace	Level 3	2	Registered
Core	116630 Install and maintain support in surface mines and quarries	Level 3	10	Registered
Core	116666 Carry out secondary breaking using explosives	Level 3	11	Registered
Elective	116932 Operate a personal computer system	Level 1	3	Registered
Elective	10490 Carry out secondary breaking by mechanical means	Level 2	8	Reregistered
Elective	10745 Cut mild steel by means of an Oxy-acetylene cutting torch	Level 2	3	Registered
Elective	14911 Participate in formal meetings	Level 2	3	Registered
Elective	115613 Conduct fire fighting in surface mines	Level 2	16	Registered
Elective	116625 Split dimension stone blocks by means of non explosive methods	Level 2	4	Registered
Elective	116632 Drill holes for blasting and/or splitting dimension stone blocks using a mechanised drill rig	Level 2	6	Registered
Elective	116658 Drill intersecting holes for diamond wire sawing	Level 2	7	Registered
Elective	116937 Use a Graphical User Interface (GUI)-based spreadsheet application to create and edit spreadsheets	Level 2	4	Registered
Elective	117924 Use a Graphical User Interface (GUI)-based word processor to format documents	Level 2	5	Registered
Elective	230011 Drill medium diameter blast holes using an hydraulic or pneumatic drilling rig and compressor	Level 2	5	Draft - Prep for P Comment
Elective	230018 Operate a mixer-placer explosives truck	Level 2	6	Draft - Prep for P Comment
Elective	230020 Drill small diameter blast holes using a percussion drilling rig and compressor	Level 2	5	Draft - Prep for P Comment
Elective	110218 Collect, store and issue explosives from a surface magazine	Level 3	10	Registered
Elective	116614 Conduct blasting operations in dimension stone quarries	Level 3	15	Registered
Elective	116622 Lift and position loads	Level 3	12	Registered
Elective	116626 Handle dimension stone blocks by means of front end loader	Level 3	13	Registered
Elective	116627 Demonstrate basic understanding of dimension stone geology and mineralogy	Level 3	16	Registered
Elective	116663 Make saw cuts by means of diamond wire saw	Level 3	15	Registered
Elective	117877 Perform one-to-one training on the job	Level 3	4	Registered
Elective	230010 Demonstrate knowledge of the geological nature of surface extraction sites	Level 3	6	Draft - Prep for P Comment

Elective	230012 Blast materials in quarry operations	Level 3	15	Draft - Prep for P Comment
Elective	230013 Conduct face profiling and blast hole surveys	Level 3	6	Draft - Prep for P Comment
Elective	230014 Carry out basic surveying and calculations in quarries	Level 3	8	Draft - Prep for P Comment
Elective	230019 Demonstrate and apply knowledge of dimension stone quality and geology to block extraction	Level 3	21	Draft - Prep for P Comment
Elective	13941 Apply the budget function in a business unit	Level 4	5	Reregistered
Elective	230016 Design blasts for quarry operations	Level 4	24	Draft - Prep for P Comment
Elective	230017 Carry out blasting environmental testing	Level 4	6	Draft - Prep for P Comment
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5	Reregistered
Fundamental	9010 Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2	Reregistered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Reregistered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Reregistered
Fundamental	119457 Interpret and use information from texts	Level 3	5	Registered
Fundamental	119465 Write/present/sign texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	119467 Use language and communication in occupational learning programmes	Level 3	5	Registered
Fundamental	119472 Accommodate audience and context needs in oral/signed communication	Level 3	5	Registered



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

## Demonstrate knowledge of the geological nature of surface extraction sites

SAQA US ID	UNIT STANDARD TITLE		
230010	Demonstrate knowledge of the geological nature of surface extraction sites		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 3	Regular

**SPECIFIC OUTCOME 1**

Explain the nature of rocks and minerals.

**SPECIFIC OUTCOME 2**

Explain the geological unconformities at surface extraction sites.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Drill medium diameter blast holes using an hydraulic or pneumatic drilling rig and compressor

SAQA US ID	UNIT STANDARD TITLE		
230011	Drill medium diameter blast holes using an hydraulic or pneumatic drilling rig and compressor		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	5	Level 2	Regular

**SPECIFIC OUTCOME 1**

Explain the requirements for the blasthole drilling of medium diameter holes.

**SPECIFIC OUTCOME 2**

Prepare to drill medium diameter blast holes.

**SPECIFIC OUTCOME 3**

Drill medium diameter blastholes.

**SPECIFIC OUTCOME 4**

Finalise drilling operations.





## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

## Blast materials in quarry operations

SAQA US ID	UNIT STANDARD TITLE		
230012	Blast materials in quarry operations		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SG3 Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 3	Regular

**SPECIFIC OUTCOME 1**

Explain the blasting operations and requirements in quarries.

**SPECIFIC OUTCOME 2**

Prepare to conduct blasting operations in quarries.

**SPECIFIC OUTCOME 3**

Charge up and initiate the blast.

**SPECIFIC OUTCOME 4**

Treat and blast misfires.

**SPECIFIC OUTCOME 5**

Destroy old explosives.

**SPECIFIC OUTCOME 6**

Conduct post-blasting operations.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

4

## Conduct face profiling and blast hole surveys

SAQA US ID	UNIT STANDARD TITLE		
230013	Conduct face profiling and blast hole surveys		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 3	Regular

**SPECIFIC OUTCOME 1**

Plan and prepare for blast area survey.

**SPECIFIC OUTCOME 2**

Operate the survey equipment to conduct face profiling and drill hole surveying.

**SPECIFIC OUTCOME 3**

Produce survey results and make inputs to the rockbreaking processes.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

5

## Carry out basic surveying and calculations in quarries

SAQA US ID	UNIT STANDARD TITLE		
230014	Carry out basic surveying and calculations in quarries		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB Mining and Minerals		6	
UNIT STANDARD TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	8	Level 3	Regular

**SPECIFIC OUTCOME 1**

Explain basic surveying practices in quarries.

**SPECIFIC OUTCOME 2**

Perform basic surveying tasks.

**SPECIFIC OUTCOME 3**

Transfer data from quarry plans into the field.

**SPECIFIC OUTCOME 4**

Conduct basic quarry calculations.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

## Mark off drill holes for blasting in quarries

SAQA US ID	UNIT STANDARD TITLE		
230015	Mark off drill holes for blasting in quarries		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	3	Level 2	Regular

**SPECIFIC OUTCOME 1**

Explain the drilling and blasting requirements.

**SPECIFIC OUTCOME 2**

Prepare to mark off the workplace for drilling.

**SPECIFIC OUTCOME 3**

Mark off the workplace to be drilled.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

7

## Design blasts for quarry operations

SAQA US ID	UNIT STANDARD TITLE		
230016	Design blasts for quarry operations		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	24	Level 4	Regular

**SPECIFIC OUTCOME 1**

Explain legal requirements relating to blasting in quarries.

**SPECIFIC OUTCOME 2**

Explain the types, application and selection of explosives, initiation systems and accessories used and required in quarries.

**SPECIFIC OUTCOME 3**

Explain the drilling equipment required and their applications in quarries.

**SPECIFIC OUTCOME 4**

Explain the factors influencing blast design and their impacts on quarry operations.

**SPECIFIC OUTCOME 5**

Design safe and efficient quarry blasting.

**SPECIFIC OUTCOME 6**

Estimate the likely environmental effects of the quarry blasts.

**SPECIFIC OUTCOME 7**

Monitor the blasting performances and take appropriate actions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

8

## Carry out blasting environmental testing

SAQA US ID	UNIT STANDARD TITLE		
230017	Carry out blasting environmental testing		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 4	Regular

**SPECIFIC OUTCOME 1**

Plan and prepare for environmental testing of blasts in surface mines and quarries.

**SPECIFIC OUTCOME 2**

Operate the environmental testing equipment.

**SPECIFIC OUTCOME 3**

Produce results, interpret the findings and make inputs to the rockbreaking process.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

9

## Operate a mixer-placer explosives truck

SAQA US ID	UNIT STANDARD TITLE		
230018	Operate a mixer-placer explosives truck		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 2	Regular

**SPECIFIC OUTCOME 1**

Explain the requirements with regards to the operating of a mixer-placer explosives truck.

**SPECIFIC OUTCOME 2**

Prepare to operate a mixer-placer explosives truck.

**SPECIFIC OUTCOME 3**

Place explosives into blastholes.

**SPECIFIC OUTCOME 4**

Finalise operating a mixer-placer explosives truck.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

10

Demonstrate and apply knowledge of dimension stone quality and geology to block extraction

SAQA US ID	UNIT STANDARD TITLE		
230019	Demonstrate and apply knowledge of dimension stone quality and geology to block extraction		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	21	Level 3	Regular

**SPECIFIC OUTCOME 1**

Explain product knowledge, mining and processing technologies and applications of dimension stone.

**SPECIFIC OUTCOME 2**

Explain dimension stone economics, quality and market requirements.

**SPECIFIC OUTCOME 3**

Plan and mark cutting lines for block extraction in quarries.

**SPECIFIC OUTCOME 4**

Plan and mark cutting lines for block dressing.





## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

11

## Drill small diameter blast holes using a percussion drilling rig and compressor

SAQA US ID	UNIT STANDARD TITLE		
230020	Drill small diameter blast holes using a percussion drilling rig and compressor		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
SGB Mining and Minerals	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	5	Level 2	Regular

**SPECIFIC OUTCOME 1**

Explain the requirements for small diameter blasthole drilling.

**SPECIFIC OUTCOME 2**

Prepare to drill small diameter blast holes.

**SPECIFIC OUTCOME 3**

Drill small diameter blastholes.

**SPECIFIC OUTCOME 4**

Finalise drilling operations.

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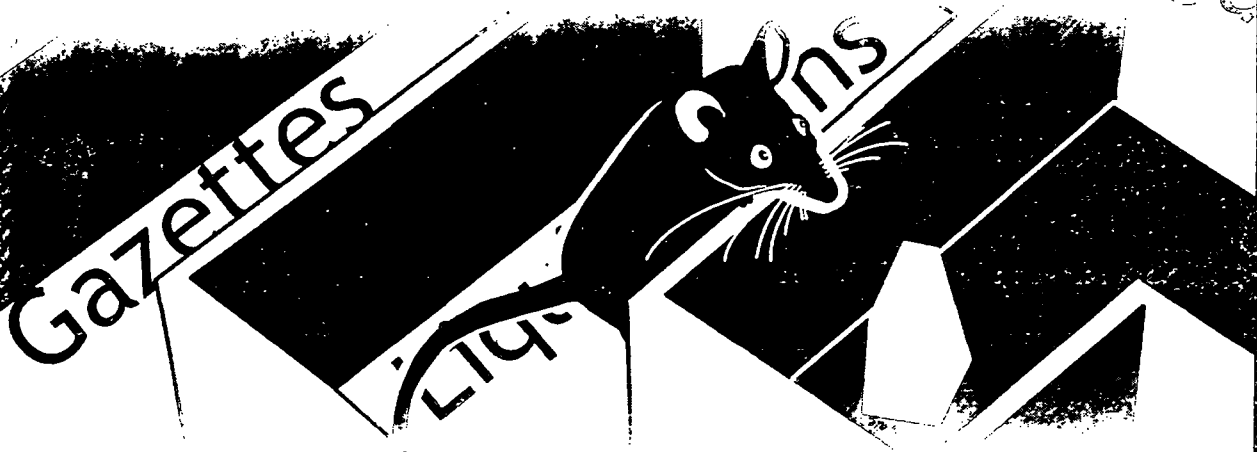
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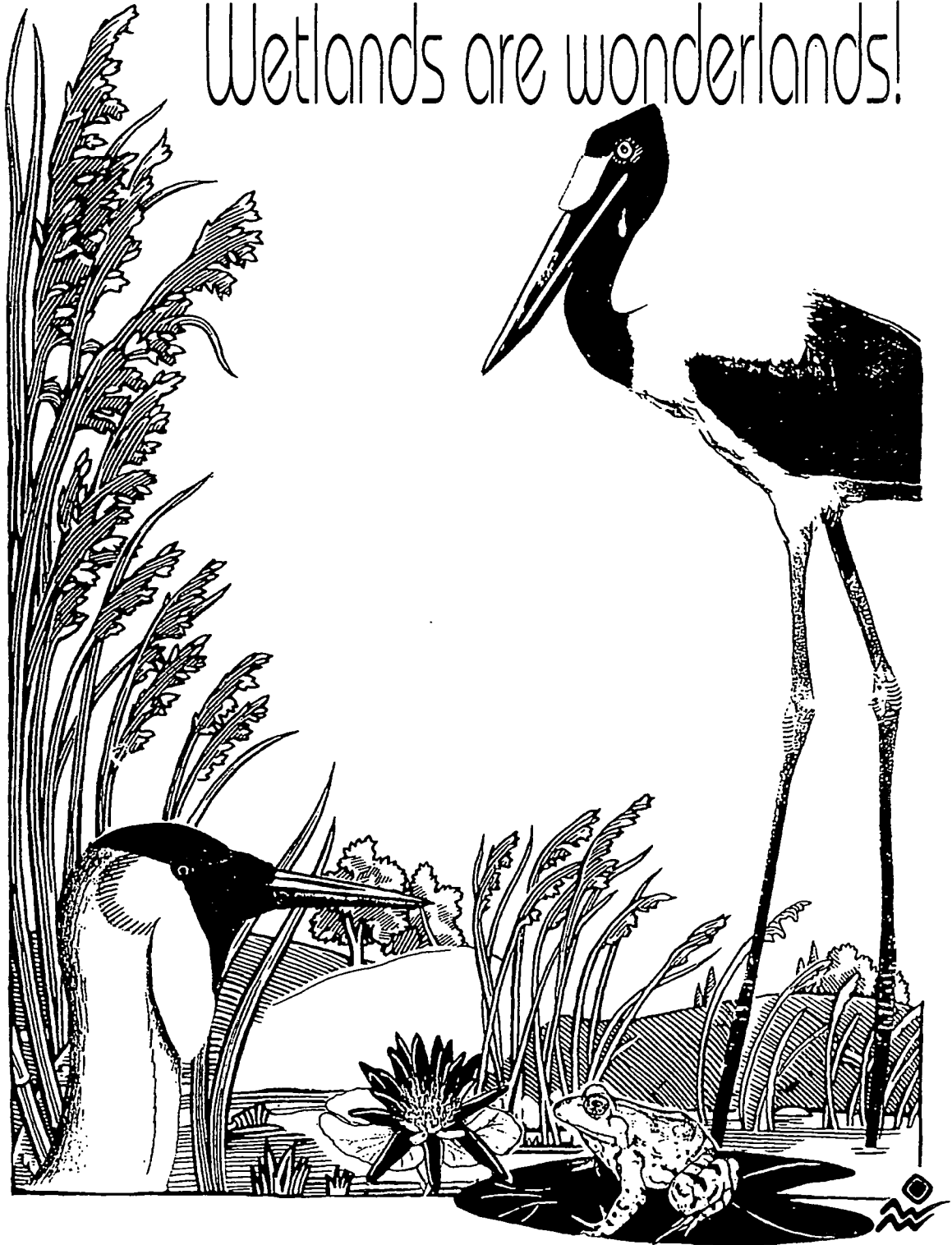
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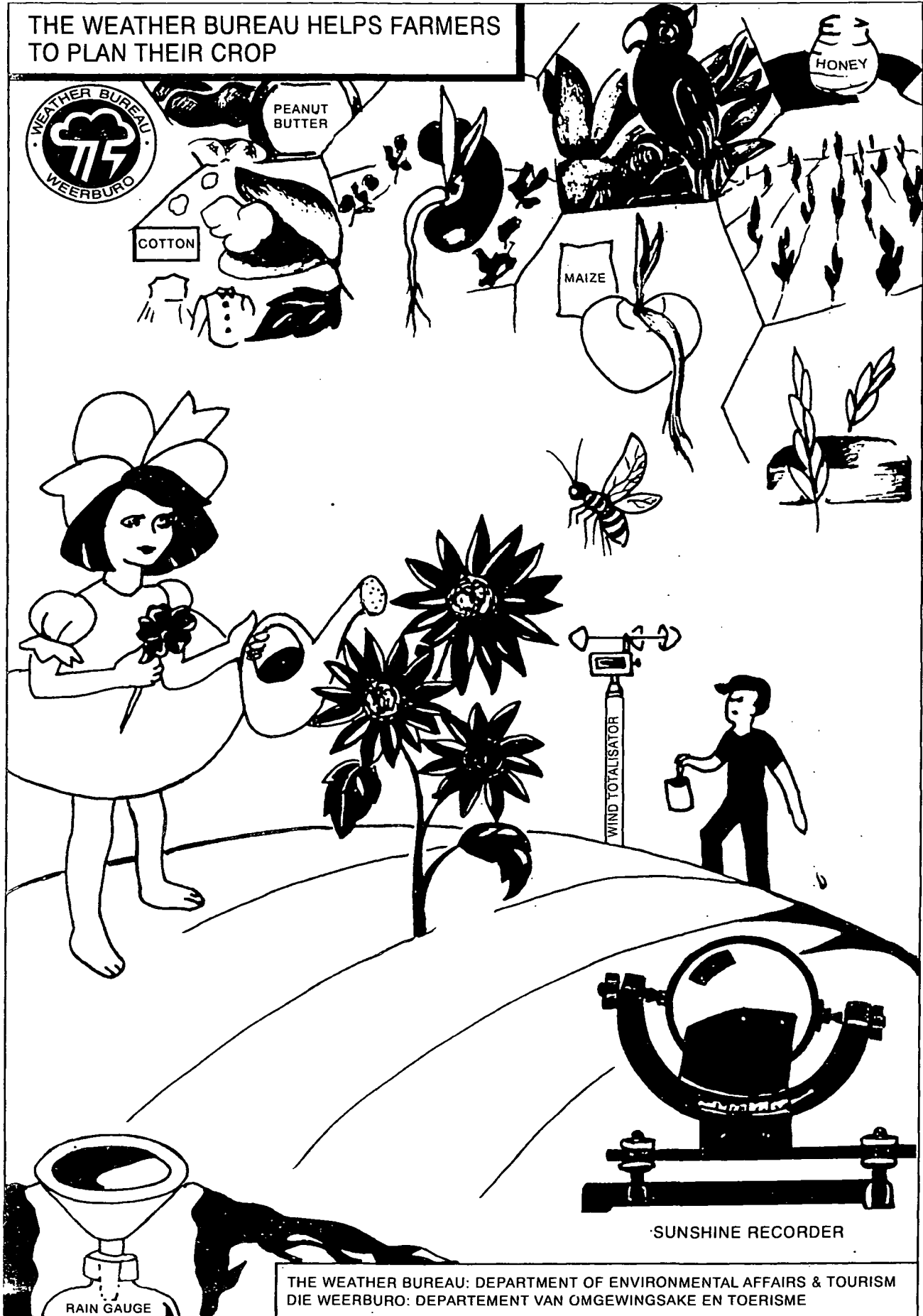


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