

**GUIDELINES**  
**for**  
**ICT INTEGRATION**  
**with**  
**NCS SUBJECTS**  
**in**  
**GRADES 10-12**



Developed by the Western Cape Education Department

## The Intention of the Guidelines

This document aims to assist schools in the process of integrating ICT (Information and Communication Technologies) with their teaching and learning. It provides guidance in

- General use of ICTs across all subjects
- Use of ICTs in each specific FET subject
- Educational software and how to evaluate it
- Use of the World Wide Web in each subject
- Digital resources being provided by the WCED

Each teacher should, as a minimum, have access to the introduction and the pages dealing with his/her specific subject.

### Acronyms

AS	Assessment standard
CD-ROM:	Compact disc – read-only memory
Ce-I	Centre for e-Innovation
DVD	Digital Versatile Disc/ Digital Video Disk
FET	Further Education & Training
HEI	Higher Education Institution
ICT	Information & Communication Technology
INSET	In-service training
LO	Learning outcome
NCS	National Curriculum Statement
SKAV	Skills, Knowledge, Attitudes and Values

# Guidelines for ICT Integration with NCS Subjects in Grades 10-12:

## INTRODUCTION

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**A global revolution is currently taking place in education and training. It is driven by the changing nature of work, the realities of the information age, new global partnerships and an awareness of the need for equal distribution of educational opportunities. *White Paper on e-Education: Transforming Learning and Teaching through Information and Communication Technologies (ICTs)* Department of Education, 2004.**

### Context

Information and Communication Technologies are becoming more and more integral to the lives of South Africa's citizens. To prepare them for their adult working lives, but also to enhance their education, learners are being given access to computers and other digital resources as an integral part of their preparation for the National Senior Certificate. Unprecedented access for all to relevant information through the World Wide Web is an important facility in the implementation of outcomes-based education.

The Further Education and Training phase of the National Curriculum Statement is being implemented from 2006. A number of subjects specify the use of digital resources in order for learners to achieve the learning outcomes. Computer Applications Technology and Information Technology learners will use computers from the beginning of 2006 as they enter Grade 10. The following subjects are being prioritised nationally for learner computer use from 2007: Accounting, Civil Technology, Design, Electrical Technology, Engineering Graphics and Design, Geography, Life Orientation, Mechanical Technology, Tourism and Visual Arts. It is clear that other subjects will also be enhanced by the use of digital resources.

Digital resources include teaching and learning material distributed by means of telecommunications, satellite technologies, CD ROMs and television broadcast media. One type of digital support material that is widely used in South African schools is educational software and applications. Associated with these are computer peripherals such as interactive whiteboards, probes, sensors, keyboards and other computer-controlled equipment to enhance learning and teaching.

### Educational software and its evaluation

Schools will want to review available software and select what best suits their circumstances. **Appendix A** is a software evaluation and profile form, which can be used to evaluate software for possible use in schools.

Teachers need to take into account the following factors when selecting software:

- The purpose of the software, e.g. information transfer, drill & practice, simulation / case studies, problem solving, calculation, creative thinking, writing, graphics, logic and critical thinking
- The way in which it is to be used - by individuals, small groups, or for whole class teaching with or without an interactive whiteboard or a NetOp system
- Its compliance with the school network (if applicable), and whether it is Windows- or Linux-based

- What support is available for the software: whether there is a help line or online help, free training, and whether the publisher offers free updates
- The cost: whether it is payable once off or a recurring annual fee

Once these aspects have been ascertained, teachers should consider the following aspects of the software:

- Its content:
  - Relevance to the NCS subject(s) for which it would be used and its compatibility with OBE methodologies (NCS subject learning outcomes and assessment standards addressed by the software)
  - Appropriateness or adaptability to the South African context: free from cultural, racial, gender and language bias and in language suitable for learners
  - Accuracy of information
  - Logical progression in conceptual development and content
  - Where necessary, scope for differentiation, allowing learners to work on different levels
  - Provision for interactive learner participation and learner interest, variation in activities, with increasing complexity
  - Sufficient, relevant practice in appropriate skills.
- Its presentation:
  - Learning outcomes should be clearly stated with easy-to-use screen instructions
  - Appropriate presentation format and use of colour, sound and graphics
  - Appropriate learner control
  - Free of technical flaws
- Its use of question and response:
  - The questions asked or required responses should be appropriate to learning outcomes
  - There should be appropriate evaluation of learner responses and appropriate feedback to learners which provides remedial assistance where necessary
- Its teacher and learner management facilities:
  - Customisation for individual learning needs
  - Option for learners to exit and resume at a later stage
  - Learner performance record
  - Educator control
  - Testing for prior learning
  - Addition of own learning material
  - The amount of time the teacher must spend on preparation
- It is a bonus when the software is also useful for teachers' own professional development

It is evident that the factors above are not necessarily either positive or negative as they may be irrelevant to what the learners need to achieve. They should be evaluated in terms of what is appropriate for the classroom situation.

## **Installation of software on school networks**

Software vendors are required to include installation services as well as support, maintenance and upgrades in the purchase price of their products.

## **Software compatibility with school networks**

Computers in most schools operate on a Windows platform. However, the growing use of open source platforms in schools is becoming a significant factor that has necessitated a widening of the search for appropriate educational software to enhance teaching and learning in our classrooms. Because of the lack of accessible open source software, most software recommended in following pages is Windows-compatible. However, as we become aware of useful open source software these titles will be added.

## **Copyright, intellectual property and piracy**

The Department of Education upholds the principles and provisions of the Copyright Act, No 98 of 1978 as amended, and the Patents Act, No 57 of 1978 as amended. The purpose of copyright law is to protect the interests of the copyright owners - the authors, developers and publishers, as creators of intellectual property. Copyright law affects digital educational resources as much as print or any other medium. There is a moral as well as a legal obligation for all in the education system to operate within copyright law, to respect intellectual property, and to avoid and prevent software piracy.

The system of software licensing sets clear permissions for purchasers in the use of software onsite. It is the responsibility of schools to purchase the correct license for their circumstances from the software provider. This may be a site license, single or multiple user license, and be valid for the life of the software or for a fixed period of time. Exceptions are

- shareware (copyrighted, with free access, but the user is requested to pay a small amount to use the program)
- public-domain software (not copyrighted; free and can be used without restriction)
- freeware (copyrighted, usually allowing free use of the software, but no alteration or sale)
- open source software (the source code is freely available for use and modification, particularly for sharing with the community. Some products may be 'OS certified'.)

Schools must thus operate within copyright law, ensuring that teachers and learners respect intellectual property at all times, and take appropriate steps to prevent software piracy in the school community.

## **The World Wide Web**

As more schools gain access to the Web, the value of educational websites for teachers and learners in the Western Cape becomes more evident. There has never before been such free and open access to information. With the advent of outcomes-based education, learners are required to find, process and present information. Although textbooks remain of prime importance, learners need access to a far wider range of learning resources, whether print or multimedia, than ever before. Because access to the Internet is still relatively costly in South Africa, schools need to investigate facilities such as an intranet so that teachers can download useful websites for use by their learners offline.

Schools using the Internet for the first time need to set up an *Acceptable Use Policy* which lays down the conditions under which the Web and email may be used, and sets the standards of acceptable behaviour. An intranet will help to solve the problem of learners accessing inappropriate websites.

A number of useful websites are mentioned in the rest of this Guide. Amongst them is the Digital Resources website (<http://curriculum.wcape.school.za/site/113>) which will carry the electronic version of this document which will be updated from time to time, as further curriculum, software and online resource information become available.

### **Digital Resources for FET subjects**

The documents for each subject contain information regarding the use of ICT-based support materials in the NCS FET subjects. They specify learning outcomes and assessment standards that involve computer use, as well as the aspect of each subject that is most appropriate to the use of computers. Mention is also made of planning and assessment, suggested software and relevant websites.

It should be noted that the website addresses were operational at the time of publication. If this is no longer the case, readers should check whether new addresses for these sites have been posted in the updated version of this document on the Digital Resources website.

### **DISCLAIMER**

Although propriety software is mentioned in the documents, this does not indicate that the software is endorsed by the Department of Education

## **APPLICATIONS AND SOFTWARE FOR USE IN ALL FET SUBJECTS FOR GRADES 10-12**

The following types of application and software enable teachers and learners in all subjects to use computers to implement and enhance the curriculum. The list below is not exclusive or exhaustive, and does not preclude the use of other appropriate software. It ranks applications and software from essentials to more specialised resources.

**Word processor, spreadsheet, presentation and database applications: Microsoft Office or Open Office**

**Antivirus software: Norton, McAfee**

**Software to read pdfs: Adobe Acrobat Reader**

**Web browser: Explorer, Netscape, Opera, Mozilla Firefox**

**Email: Pegasus, Outlook Express, Mozilla Thunderbird**

**Graphics software: Image Composer, Adobe Creative Suite II, Adobe Photoshop Essentials, CorelDraw, Fireworks (Macromedia)**

**Utility software: Winzip, NetOp (computer lab management tool), Flash Player, Quick Time, Windows Media Player**

**Mind-mapping software: Inspiration, Smart Ideas, Visio**

**Encyclopaedia: Encarta, SA Encyclopaedia / Ensiklopedie**

**Content development tools: Hot Potatoes (from <http://hotpot.uvic.ca/>), Evalunet, Construct Author, Navigator and Roleplaying Engine (Reusable Objects), Breeze, W3 generator (from Cape Multimedia)**

**Web authoring software: Microsoft FrontPage**

**Intranet program: IntraWeb**

**Antispyware: Spybot**

**Assessment software: Rubricate**

**Mindset multimedia, video and print materials**

Suggested peripherals for all subjects:

**CD and DVD writers, data projectors, digital cameras, interactive whiteboards, printers for A4, A3 and colour, scanners, television, depending on need.**

In addition to the websites listed in each subject, it is suggested that the following sites be consulted for information relevant to all subjects:

**National Department of Education website (policy and news):**

<http://education.pwv.gov.za/>

**National Education portal:**

<http://www.thutong.org.za>

**WCED Provincial education portal**

<http://wced.wcape.gov.za/home/home.html>

including the Curriculum website

<http://curriculum.wcape.school.za>

**Digital Resources website**

<http://curriculum.wcape.gov.za/site/113/>

**the Examinations website**

<http://data.westerncape.gov.za/pls/emis/webpub2.examresults.home>

**Edulis** (WCED Library and Information Service):

<http://edupals.wcape.gov.za>

**Edumedia** (WCED media production service):

[http://edumedia.wcape.school.za/catalog/welcome\\_s.html](http://edumedia.wcape.school.za/catalog/welcome_s.html)

**Khanya**

<http://www.khanya.co.za>

**Wikipedia** (free online encyclopaedia)

<http://en.wikipedia.org/>

English

<http://af.wikipedia.org/wiki/Tuisblad>

Afrikaans

[http://xh.wikipedia.org/wiki/Main\\_Page](http://xh.wikipedia.org/wiki/Main_Page)

IsiXhosa

**Search Engines**

<http://www.google.co.za/>

<http://www.yahoo.com/>

<http://www.lycos.com/>

**Excellent international curriculum resource sites and portals**

<http://www.teem.org.uk> (UK)

Excellent software and online resources evaluation

<http://www.curriculumonline.gov.uk> (UK)

An excellent multimedia resources site, which includes numerous links to free resources suitable to support teaching and learning in most FET subjects. Worth exploring.

<http://tre.ngfl.gov.uk> (UK)

The Teacher Resource Exchange (TRE) is a moderated database of resources and activities created by teachers. Resources on the exchange are checked by subject specialists to ensure they are of the highest possible quality.

<http://www.teachernet.gov.uk/wholeschool/ictis/> (UK)

A useful site which explores learning, teaching and managing of ICT in teaching and learning.

<http://www.ali.apple.com/> (US)

Apple Learning Interchange – An exciting and innovative learning exchange showcasing purposeful and vibrant use of ICT in numerous subjects

<http://horizon.unc.edu/projects/monograph/CD/> (US)

An informative site highlighting accounts of teachers who have agreed to share with others their encounters with using technology in their classes. This site includes exemplars from language, music, science and mathematics subject areas.



<http://www.sitesforteachers.com> (US)

A directory of 959 sites for teachers.

<http://www.moe.gov.sg/edsoftware/ir/> (Singapore)

A fascinating and innovative site providing free access to interactive resources for use in selected FET subjects. Worth viewing.

<http://www.moe.gov.sg/evideo/> (Singapore)

An e-video site providing access to free quality educational videos which can be used to successfully support classroom teaching and learning in selected FET subject areas.

<http://www.dest.gov.au/default.htm> (Australia)

This site shows the breadth and depth of national Australian ICT integration in education policy and research, and its involvement as a force in the economy and society.

<http://www.eddept.wa.edu.au/cmisis/eval/curriculum/> (Australia)

This site identifies curriculum materials that support West Australian school curriculum applications. All types of curriculum-related resources are reviewed for teachers and students. Resources are adaptable for use in South Africa.

<http://www.schools.nsw.edu.au/> (Australia)

ICT has been well integrated in New South Wales education for a considerable time. This site provides access to a number of useful resources for schools such as professional support and school technologies (<http://www.schools.nsw.edu.au/learning/yrk12focusareas/learntech/index.php>)

[http://www.edu.pe.ca/journeyon/resources\\_pages/curriculum\\_guides/hscurriculumguides.htm](http://www.edu.pe.ca/journeyon/resources_pages/curriculum_guides/hscurriculumguides.htm) (Canada)

This site provides access to excellent ICT integration guides for the following Canadian curriculum subjects namely: Mathematics, Biology, English, Chemistry, Physical Science and Social Science. The suggestions made can be aligned quite effortlessly to comparative FET subjects.

<http://www.schoolnet africa.net> (Africa)

The Schoolnet Africa site provides access to a couple of useful software packages for learners. Follow the learning resources link from the homepage.

<http://www.unescobkk.org/index.php?id=1716>

This UNESCO site link provides meaningful access to numerous educational software sites for a number of subject areas.

<http://www.unescobkk.org/index.php?id=1718>

This UNESCO site link provides value information on and simple examples of ICT integration in teaching and learning.

[http://www.tki.org.nz/r/ict/software/learning\\_snapshots\\_e.php](http://www.tki.org.nz/r/ict/software/learning_snapshots_e.php) (New Zealand)

This software for learning site provides snapshots of how numerous software is being used successful at teaching and learning sites

The best venue(s) for the location of computers:

- **Workstations for teachers: in staff rooms or work rooms**
- **Workstations for learners: in computer laboratories, as well as single or a small number of workstations in media centres, libraries, classrooms, laboratories, workshops, arts and design rooms.**
- **Notebooks and/or hand-helds for teacher use and flexible groupwork in various locations.**

**ACCOUNTING**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Learning Outcome 1, Assessment Standard 2: Within the context of the Accounting cycle, identify and complete source documents, record the information in the subsidiary journals, post to the ledgers and draw up the trial balance manually and/or by using an accounting package.**

The aspect of this subject that is most appropriate to the use of computers is:

**As above, as well as assessment tasks like the project where research would be necessary.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Projects as stipulated, other tasks could include research, presentations, reports, etc. These could all be computer generated.**

Suggested software for use in this subject:

**Quickbooks**

**Pastel**

**Lledgerz**

**Interactive Business: Finance and Accounting**

Suggested URLs for websites for use in this subject:

**Accounting sub-site on the WCED Curriculum website:**

<http://curriculum.wcape.school.za/site/18/page/view>

**Department of Trade and Industry**

<http://www.thedti.gov.za/>

**Cape Town Chamber of Commerce**

<http://www.capechamber.co.za/>

**Johannesburg Stock Exchange**

<http://www.jse.co.za/>

**South African Revenue Service**

<http://www.sars.gov.za/>

## AFRIKAANS ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Learning Outcome 1: Listening and Speaking – Assessment Standards 1, 2, 3 and 4**

**Learning Outcome 2: Reading and Viewing – Assessment Standards 1, 2, 3 and 4**

**Learning Outcome 3: Writing and Presenting – Assessment Standards 1, 2 and 3**

**Learning Outcome 4: Language – Assessment Standards 1, 2 and 3**

- **Acceleration process - learner paced and learner based**

The aspect of this subject which is most appropriate to the use of computers is:

- **All 4 Learning Outcomes play a pivotal role in language acquisition and can also be promoted by means of software.**
- **Skills and content knowledge development**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Listening and Speaking activities**

**Reading strategies based on various text forms**

**Writing and presenting – planning skills, writing strategies and techniques and presenting of final draft**

**Language exercises**

**NB; It is important that users of software should always be aware of the spelling and grammar that is used.**

Suggested software for use in this subject:

**EYE Read**

**Readers are Leaders**

**CAMI Read**

Suggested URLs for websites for use in this subject:

**Afrikaans sub-site on the WCED curriculum website**

<http://curriculum.wcape.school.za/site/59/>

**University of Pretoria – Resource site for teachers**

<http://www.onnet.up.ac.za/>

**Roekeloos – Afrikaans resource site**

<http://www.roekeloos.co.za/boekrak/boekr138.html>

**This site includes an English-Afrikaans dictionary.**

**African Languages – list of Afrikaans sites**

<http://www.africanlanguages.com/afrikaans/>

**Spel - list of Afrikaans software products and sites**

<http://www.spel.co.za/>

**Afrikaans Wikipedia**

<http://af.wikipedia.org/wiki/Tuisblad>

**News24 – links to Afrikaans newspapers online**

<http://www.news24.com/News24/Home/>

## AGRICULTURAL SCIENCES

### ICT INTEGRATION FOR GRADES 10-12

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Learning Outcome 1 Assessment standard 4: Use information communication technology skills related to agricultural production practices in Grade 11**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Learning outcomes 1 (assessment standards 1 – 3) and Learning outcomes 2 (assessment standards 1 – 4)**

**Although it is not compulsory, it would be to their advantage to use certain software programs such as simulations, programs where they can vary the variables in an experiment, animations, drawings, electron micrographs from the internet, Excel to record results and plot graphs, irrigation and fertilisation programs, etc.**

The aspect of this subject which is most appropriate to the use of computers is

**Drawings, images, flow charts and pictures from the internet**

**Dissections – software programmes are available**

**Experiments – to vary the different variables (production factors) (pH, temperature, oxygen and carbon dioxide concentration, irrigation, fertilisation)**

**Graphing – plot different types of graphs (line, histograms, pie charts)**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Graphs, tables, illustrations, flow charts, electron micrographs in research projects as long as they are acknowledged**

Suggested software for use in this subject:

**Data Harvest equipment sets and software**

**Sunflower Multimedia for Science**

**Xplorer GLX**

Suggested URLs for websites for use in this subject:

**Agricultural Science sub-site on the WCED curriculum website**  
<http://curriculum.wcape.school.za/site/16/page/view/642>

**Eurekaalert – directory of sites**  
<http://www.eurekaalert.org/>

**National Dept of Agriculture**  
<http://www.nda.agric.za>

**Agritv -Agriculture site**

<http://www.agritv.co.za>

**Agricon Africa**

<http://agribiz.netfirms.com/index.htm>

**Agriculture in South Africa**

<http://www.intouchagri.co.za/newspage.asp>

**Organic Farming**

<http://www.go-organic.co.za/>

## **BUSINESS STUDIES**

### **ICT INTEGRATION FOR GRADES 10-12**

**Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:**

No specific Assessment Learning Outcomes and Assessment standards – recommended that learners use computer in Business Studies mainly for:

- Preparation of assignments and projects: Mainly Word, Excel, Power Point, (also Electronic White board)
- Surfing of the web for research purposes
- Using recommended software to help attain certain Assessment standards, e.g. business games
- Assimilation of contents (e.g. mind-mapping) by means of suitable software, especially for teachers, but also for learners, e.g. ‘Smart Ideas’ and ‘Inspiration’
- Participation in Business Studies related (especially entrepreneurship) competitions (e.g. market days/ Business plans etc)
- Regular (daily access) Web search of current economic issues – especially News paper articles etc on suitable web-sites – presentation thereof by means of Power point / electronic white board

**Possible applications:**

#### **Learning Outcome 1 Business Environments**

**Grade 10 / 11 /12** LO 1 AS1 – 2: Components and features of business environments – use also “Google earth”

AS3: Web search/monitoring: News pages : Socio-economic issues that impact on business (Grade 10) / social responsibility (Grade 12)

AS4: Web research (including “Google world”) – Investigation on nature of business in the vicinity (Grade 10) / Links between enterprises Grade 11 – Environments effecting a specific business (Grade 12)

AS 1-4: Presentations by learners making use of Power Point / Electronic white board

#### **Learning Outcome 2: Business Ventures**

**Grade 10:** AS1-2 Design and use a market research instrument (Ms Word/Power Point / Electronic whiteboard)

AS3: Web search including “Google earth”

AS6: Web search/monitoring of News pages – Present a variety of business related information clearly and accurately in verbal and non-verbal format (including graphs) MS Word/Excel (graphs) Power Point / electronic white board

**Grade 11:** AS3 Apply Gantt charts and time lines – e.g. Smart Notebook : (Gallery-Professional - Strategy & Gallery: History – Time lines)

AS 6 Web search/monitoring of News pages – Present a variety of business related information clearly and accurately in verbal and non-verbal format (including graphs) MS Word/Excel (graphs) Power Point / electronic white board (Including “Smart Ideas” or “Inspiration”)

AS7 Access web-sites e.g. Department of Trade and Industry (DTI) for procedures, forms, contracts etc. for starting a business

**Grade 12:** AS7 Web Research - Access web-sites of Banks, other Investment institutions, for investment opportunities

### **Learning Outcome 3: Business Roles**

**Grade 10** AS 3.2 Problem solving – Electronic white board Software e.g. Smart Notebook

AS 7 PACE Program – Investigate business careers

**Grade 11** AS3 Apply principles and skills of professional, responsible, ethical and effective business practice – also Presentation skills (e.g. Power Point / e.g. Electronic whiteboard with Software for Professional business skills e.g. Smart Notebook (Gallery – Professional: Planning/Strategy/Financial formulae)

AS 7 PACE Program – Investigate business careers

**Grade 12:** AS 3 Make recommendations for improvement of business situations - Presentation skills (e.g. Power Point / e.g. Electronic whiteboard with Software for Professional business skills e.g. Smart Notebook (Gallery – Professional: Planning/Strategy/Financial formulae)

AS7 Possible business careers – PACE programme

### **Learning Outcome 4: Business Operations**

**Grade 10** AS1-4 Software: “Smart Ideas” and “Inspiration

**Grade 11** AS 1-5 Software: “Smart Ideas” and “Inspiration” AS 4 : Marketing activities - Software : Interactive Business : “The marketing Mix”

**Grade 12** AS 3 Web search on relevant legislation: e.g. Department of Trade and Industry etc

AS 3-6 Software: “Smart Ideas” and “Inspiration

The aspect of this subject which is most appropriate to the use of computers is:

**\* Monitoring of daily business issues on news paper & financial magazine web-sites (one topic per learner per year)**

**\* Web search on curriculum related topics, as mentioned above. Formatting of rough work of research projects/assignments on computer by learners, using MS Word, inserting Pictures,**



**Tables, graphs etc (Grade 10 – 5 Assessment standards for all learners – grade 11 and 12: 2 research AS's per year)**

**\* Presentations of information, research assignments etc on Power Point/electronic white board (one per learner per Grade)**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

- **Power Point presentations**
- **Projects/assignments prepared on MS Word etc**

Suggested software for use in this subject:

**PACE programme – grade 10 career investigation**

**Interactive Business: The Marketing Mix**

**Smart Ideas**

**Inspiration**

**Google World**

Suggested URLs for websites for use in this subject:

**Bized:**

<http://www.bized.ac.uk>

**Economics & Business Educator's Association:**

<http://www.ebea.org.uk>

**Dept of trade and industry**

<http://www.thedti.gov.za/>

**Cape Town Chamber of Commerce**

<http://www.capechamber.co.za/>

**Chamber of commerce and Industry**

<http://www.chamsa.org.za/>

**Johannesburg Stock Exchange (JSE)**

<http://www.jse.co.za/>

**South African Revenue Service (SARS)**

<http://www.sars.gov.za/>

**Black Economic Empowerment (BEE)**

<http://www.bee-smme.co.za/index.htm>

**Gauteng Economic Development (GED)**

<http://www.geda.co.za/>

**CIVIL TECHNOLOGY**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Grade 10 Learning Outcome 4 Assessment Standard 4**

**Introduction to CAD drawings**

**Grade 11 Learning Outcome 4 Assessment Standard 4**

**Basic CAD drawings.**

**Grade 12 Learning Outcome 4 Assessment Standard 2 & 3**

**Drawing house plans**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**The practice in industry and in the drawing office is to move away from paper-based drawings. The focus has become increasing more towards CAD generated drawings. In order to make education relevant to the world of work it is essential that learners be exposed to the current technologies.**

The aspect of this subject which is most appropriate to the use of computers is

**Executing Civil and Electrical layout drawings using Computer Aided Drawing software.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**CAD drawings**

Suggested software for use in this subject:

**AutoCAD**

**AllyCAD**

**CADDIE**

**ModelSmart**

**OR any other suitable CAD package**

Suggested websites/facilities for teacher training:

<http://curriculum.wcape.school.za/site/35/page/view/>

## COMPUTER APPLICATIONS TECHNOLOGY

### ICT INTEGRATION FOR GRADES 10-12

Learners must use a computer to achieve these learning outcomes & assessment standards:

**LO 1: Operational knowledge of ICTs (and all its Assessment Standards)**

**LO 2: Integrated end-user computer applications skills and knowledge in problem solving (and all its Assessment Standards)**

**LO 3: Information management (and all its Assessment Standards)**

- **As Computer Applications Technology is about the effective use of ICTs in an end-user environment, all the LOs and ASs demand the use of computers.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

- **Most of the items in the Programme of Assessment, as well as for daily assessment would be electronic.**
- **Comment: There is strong debate around the use of electronic assessment tasks to assess the "theory aspects" of the subject where the software automatically mark and generate the marks.**

Suggested software for use in this subject:

- **Operating Systems**  
Windows platform: Windows 98, (preferably XP Professional)  
Open Source platform: Linux Suse, Linux Redhat, Linux Fedora or any recent Linux distribution
- **Office automation**  
Microsoft: MS Office Professional  
Optional Packages: MS Publisher and/or Frontpage  
Database Package: MS Access  
Anti-Virus Package: Norton Anti-Virus  
Open Source: Open Office, Star Office  
Optional Packages: any suitable publisher and/or web development software  
Database Package: REKALL, MySQL
- **Internet Browsers and Email software**  
Microsoft: Explorer, Netscape or Opera  
E-Mail: Pegasus or Outlook Express  
Open Source: Mozilla, any suitable browser
- **Data Recovery software**
- **Software that would serve as a 4<sup>th</sup> / additional package (additional to word-processing, spreadsheets and database). It can be presentations, web authoring, desktop publishing, graphics, CAD, etc.**
- **Typing tutor program such as Typequick or KAZ**

Suggested URLs for websites for use in this subject:

**Curriculum Website:**

<http://curriculum.wcape.school.za/site/119/page/view/>

### **Other Websites**

<http://www.tomshardware.com/>  
[www.pcwebopedia.com](http://www.pcwebopedia.com)  
[www.news.com/Categories/Index/0,3,2,0Q.html](http://www.news.com/Categories/Index/0,3,2,0Q.html)  
[www.aldridge.com](http://www.aldridge.com)  
[www.ora.com/reference/dictionary/](http://www.ora.com/reference/dictionary/)

### **Memory and Cache (start with the first one)**

[www.pcguide.com/ref/ram/logic-c.html](http://www.pcguide.com/ref/ram/logic-c.html)  
[www.mindspring.com/~12co/CacheFAQ.html](http://www.mindspring.com/~12co/CacheFAQ.html)

### **IDE and SCSI**

<http://hardware.pairnet.com/scsiide>  
<http://sophia.dtp.fmph.uniba.sk/pchardware/idescsi.html>

### **Smartcards**

[www.cip.com.au/scard/](http://www.cip.com.au/scard/)

### **Speech recognition (voice-writing)**

<http://speakingsolutions.com;>  
<http://www.dragonsys.com;>  
(Source: Business Education Forum, February 2002 (<http://www.nbea.org>))

### **Assistive technology**

<http://nlbuk.org/access/braillehist.htm>  
[http://nyise.org/braille.htm;](http://nyise.org/braille.htm)  
<http://www.abledata.com;>  
<http://www.fentek-ind.com>  
<http://www.tamkeen.ae>

### **Handheld computers (palmtops)**

<http://www.palm.com/education/>  
<http://www.palm.com/products/handhelds/>

### **Keyboard instruction**

<http://www.dmoz.org/Computers/Software/Educational/Typing>  
<http://ktouch.sourceforge.net;>  
<http://www.qwerty.com>

**CONSUMER STUDIES**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standard

**LO. 1 AS 1 and 2 Grades 10, 11 and 12**

**LO. 2 AS 1- 4 Grades 10, 11, and ass.1 – 3 Grades 12**

**LO. 3 AS 1 Grade 10, AS 1, 2 Grade 11, and AS 1 – 3 Grade 12**

**LO. 4 AS 1 – 4 Grade 10, 11 and 12**

The aspect of this subject which is most appropriate to the use of computers is

**Research and projects, and practicals**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Cover pages, projects, research tasks**

Suggested software for use in this subject:

**At present there is no specific software applicable to the whole subject, but for nutrition there is Nutrition Workshop**

Suggested URLs for websites for use in this subject:

<http://curriculum.wcape.school.za/site/65/page/view>

A couple of SA sites can be added here as reference for teachers please indicate which are appropriate for subject

**South African Bureau of Standards**

<http://www.sabs.co.za/>

**Fitness Zone - Healthy eating**

<http://www.fitnesszone.co.za/nutrition.htm>

**Department of Trade and Industry**

<http://www.thedti.gov.za/>

**University of the Western Cape**

<http://www.uwc.ac.za>

Go to the Human Ecology Department

**DANCE STUDIES**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**LO 3 The learner is able to reflect on music, dance histories in past and present context and health care**

**Grade 10 Assessment Standard**

**10.3.2: We know this when the learner gathers, classifies, records and discusses information about: dance in transformative rituals, forms, styles, and purposes of dance, dance performances in the past and the present with reference to choreographic intention, use of design elements and the skills of performers.**

**Grade 11 Assessment Standard**

**11.3.2: We know this when the learner investigates and analyses: dance performances in the past and the present with reference to storytelling, biographies, choreographic intention, characteristics of style, skill of the performers, visual or emotional impact, the function and value of dance within diverse societies, communities and culture with reference to expression and communication, education, entertainment, inner fulfilment and self-realisation**

**Grade 12 Assessment Standard**

**12.3.2: We know this when the learner investigates and analyses: choreographers' works performed in the past or in the present, the training, education and experiences needed to pursue various dance career options, the planning of community dance projects**

**Grade 10 Assessment Standard**

**10.3.3: We know this when the learner demonstrates knowledge and understanding of: the human skeleton, by understanding how the major bones and joints articulate movement, effective nutrition, eating disorders, health care, a positive body image for the dancer**

**Grade 11 Assessment Standard**

**11.3.3: We know this when the learner demonstrates knowledge and understanding of: the human skeleton and its joints, explaining how they work in healthy dance practice with reference to posture/ stance, alignment and use of the spine, advanced understanding of health care, including cardiovascular fitness, strength, flexibility and lifestyle choices**

**Grade 12 Assessment Standard**

**12.3.3: We know this when the learner demonstrates knowledge and understanding of: the application of practical strategies for injury prevention and care, how to increase physical fitness.**

The aspect of this subject which is most appropriate to the use of computers is

**Using the internet to access information.**

**Using PowerPoint and MS Publisher to present information**

The following computer generated items are acceptable in a learner's portfolio of school-based

assessment in this subject:

**Assessment tools**

**History and anatomy projects**

Suggested software for use in this subject:

**MS Word, MS Publisher, Power Point**

**Life Line for choreography but only at Grade 12 advanced level**

Suggested URLs for websites for use in this subject:

**Websites for South African Dance History Research**

**Ballet Companies South Africa**

<http://www.balletcompanies.com/Countries/SouthAfrica.shtml>

**Jazzart Dance Theatre**

<http://www.jazzart.co.za/>

**Cape Town City Ballet**

<http://www.capetowncityballet.org.za/>

**Moving into Dance**

<http://www.midance.co.za/>

**Ballet Theatre African**

<http://www.ballettheatreafrican.co.za/>

**Websites for International Dance History Research**

**Ballet Companies of the World**

<http://www.balletcompanies.com/>

**Alvin Ailey American Dance Theatre**

<http://www.alvinailey.org/>

**Spanish Dance**

<http://www.dancedirectory.co.za/content/articles/articles.asp?Section=SpanishDancing>

**Martha Graham**

<http://www.marthagrahamdance.org/company/#photographs>

**George Balanchine**

[http://androsdance.tripod.com/biographies/balanchine\\_george.htm](http://androsdance.tripod.com/biographies/balanchine_george.htm)

**Merce Cunningham**

<http://www.merce.org/>

**Sir Frederick Ashton**

[http://www.abt.org/education/archive/choreographers/ashton\\_s.html](http://www.abt.org/education/archive/choreographers/ashton_s.html)

**Sir Kenneth Macmillan**

<http://www.ballet.co.uk/macmillan/>

**Paul Taylor**

<http://www.ptdc.org/>

Website for Anatomy and Health

<http://www.angelfire.com/la/dancer/Anatomy.html>



## DESIGN

### ICT INTEGRATION FOR GRADE 10-12

The acquisition of IT skills are part of the development of Design SKAVs but **MUST NEVER BE ALLOWED** to replace manual skills such as drawing, constructing, collaging, mind mapping etc)

E.g.

**LO1 Design Process: AS 1 and sub ASs: v, vi, xi**

**LO2 Design Production: AS 1 and sub ASs: i, iii, v, vii, viii**

**LO3 Context of Design: AS I and sub ASs: i, iv, viii**

Aspects of this subject which are most appropriate to the use of computers:

- **skills & content knowledge development, ethics (plagiarism and intellectual copyright issues) and global enrichment.**
- **Ability to use IT software in the design process (LO1) and design production (LO2); design in context (LO3) use of IT internet (access to URLS design sites & research).**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject: (depending on design option selected for study)

**Sub task(s) in design workbook: e.g.**

- **Computer generated items may contribute to the solving of a design problem (as evidence of one aspect of the design process) but they must not constitute the whole process or the final product(s).**
- **Evidence of basic understanding of use and purposes of design software e.g. Adobe Photoshop creative suite and ability to visualise, manipulate images and play with ideas, texts and layouts etc.**
- **Exploration and experimentation with manipulation of images**
- **Ethics and intellectual copyright:**
- **Issues concerning the manipulation of images to support ideology, beliefs, propaganda etc**
- **Presentation of on going research and content knowledge e.g. as a PPT presentation**  
**Exploration and experimentation**

Suggested software for use in this subject: there are many design based applications e.g.

**Corel Draw**

**Adobe Creative Suite**

**DesignNation**

**GIMP**

Suggested URLs for websites for use in this subject:

**There are many design and gallery sites. A suggested start is to focus on WCED curriculum development web site where there are further links:**

<http://curriculum.wcape.school.za/site/103/pqg3/view>

**National Department of Education**

<http://education.pwv.gov.za/content/documents/>

**HEIs in South Africa**

[http://africa.msu.edu/s\\_afr\\_un.htm](http://africa.msu.edu/s_afr_un.htm)

**Universities and Universities of Technology in South Africa**

[http://africa.msu.edu/s\\_afr\\_un.htm](http://africa.msu.edu/s_afr_un.htm)

**Department of Arts and Culture**

<http://www.dac.gov.za/>

**Iziko Museums of Cape Town**

<http://www.museums.org.za/iziko/>

**Cape Peninsula University of Technology**

<http://info.cput.ac.za/prospectus/cluster.php?d=5>

**Content Resource for teachers of** provides LTSM to support NCS Design (Context of Design LO3) and current 550 Art HG and Art SG History of Art and design practical SG research projects.

<http://www.asai.co.za>

**Google Search engine:**

<http://www.google.co.za/>

Look for International government education authority sites (secondary school design; design & technology education sites - UK, US, Australia, New Zealand, Canada, Japan, Korea etc)

Suggested websites/facilities for teacher training:

**WCED curriculum development web site**

<http://curriculum.wcape.school.za/site/103/page/view/>

## DRAMATIC ARTS

### ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

#### **GRADE 10, 11 and 12:**

- **Learning outcome 1: Apply Personal Resources**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet

- **Learning Outcome 2: Create, Make and Present**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet

- **Learning Outcome 3: Understand and Analyse**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet. This is mainly a theoretical outcome; the access to source material is therefore important.

- **Learning Outcome 4: Reflect and Evaluate**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet. This is a research component and the access to material on the internet is important.

The aspect of this subject which is most appropriate to the use of computers is

- **Learning Outcome 3: Understand and Analyse**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet. This is mainly a theoretical outcome; the access to source material is therefore important.

- **Learning Outcome 4: Reflect and Evaluate**

**Assessment Standards:** Educators will need support / training in how to source support material from the internet. This is a research component and the access to material on the internet is important.

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Research components, essays and any written presentations for the purposes of assessment.**

Suggested websites/facilities for teacher training:

#### **Theatre History**

**The following is a very useful site. Dr Oscar G. Brockett, well-known theatre historian, supports it. This site contains links to all theatre history covered in *The Theatre, An Introduction* written and**

compiled by Brockett (Greek, Roman, Medieval, Western Modern Drama, non-Western Theatre, as well as practical and technical theatre aspects and more):

<http://www.win.net/~kudzu/history.html>

**A digital bibliography for Brockett's *History of the Theatre***

<http://www.abacon.com/brockett/links.html>

**Interesting site that covers all aspects of theatre history**

<http://www.theatrehistory.com>

**A very comprehensive guide to internet resources in Theatre and Performance Studies ranging from acting and directing techniques, stagecraft and technical theatre, plays and playwrights, theatre organisations to electronic journals and articles:**

[http://www.stetson.edu/csata/thr\\_guid.html](http://www.stetson.edu/csata/thr_guid.html)

**This site contains easy access to useful research sites covering all aspects of theatre history and practical aspects. This site contains easy access to useful research sites covering all aspects of theatre history and practical aspects**

<http://www.videoccasions-nw.com/history/jack.html>

**Information on Henrik Ibsen**

[http://www.hf.uio.no/ibsensenteret/index\\_eng.html](http://www.hf.uio.no/ibsensenteret/index_eng.html)

**Information on Samuel Beckett**

<http://www.themodernword.com/beckett>

**Information on American theatre (vaudeville)**

<http://lcweb2.loc.gov/ammem/vshhtml/vshome.html>

**Elizabethan Theatre: focus on Shakespeare**

<http://www.bardware.com>

**Development of staging conventions / scenic spectacle**

<http://www1.appstate.edu/orgs/spectacle>

**Costume design**

<http://www.costumes.org>

**Theatre History online**

<http://www.connectedcourseware.com>

**Drama in the Classroom**

**Drama lessons and notes on all aspects of the curriculum: very valuable**

<http://drama-education.com/lessons>

**Practical drama lessons**

<http://www.teachit.co.uk>

**Useful material for lesson planning**

<http://www.whatsonstage.com>

**Interactive site with practical lesson ideas**

<http://www.virtualdramastudio.co.uk>

**Interesting information regarding practical drama aspects (acting, directing, choreography, plays,**

etc)

<http://wwar.com/categories/Theater/>

### **Technical Aspects of the Theatre**

**A very user-friendly site that looks at theatre administration, audio-visual aspects, lighting, make-up, marketing, stage management, sound, etc**

<http://www.theatrecrafts.com/>

**Theatre design: focusing on costume, lighting, set and sound**

<http://www.usitt.org>

# ECONOMICS

## ICT INTEGRATION FOR GRADES 10-12

**Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:**

No specific Assessment Learning Outcomes and Assessment standards. It is recommended that learners use computer in Economics mainly for:

- Preparation of assignments and projects: Mainly Word, Excel, Power Point, (also Interactive White board)
- Searching the Web for research purposes

**Possible applications:**

### **LO 1 Macro-economics**

Grade 10 LO 1 AS1: Career opportunities – PACE programme

AS2: Web search: Human rights and the environment

AS4: Reasons for business cycles and the impact on the economically vulnerable

Grade 11 LO 1 AS1: Web search: factors of production and their remuneration

Web research: Community participation initiatives and access of economically marginalised groups

AS3: Web search: South Africa socio-economics services

AS4: South African Industries and infrastructure, highlighting exclusion and discrimination

Grade 12 LO.1 AS1 Power Point / Electronic whiteboard presentation of circular flow model – also Excel used to demonstrate National Economic figures, e.g. (Excel: National account aggregates etc.)

AS2: Excel: Business cycles and forecasting

AS3: Exchange rates

### **Learning Outcome 2: Micro-Economics**

**Grade 10:** AS1 Power point / excel – Make use of graphs to illustrate establishment of prices and quantities

AS3: Power Point / excel: Graphs: public sector involvement

**Grade 11:** AS 1 - 3: Power Point / Excel

**Grade 12:** AS 1 - 3: Power Point / Excel

### **Learning Outcome 3: Economic Pursuits**

**Grade 10 AS1 – 3:** Web research & presentation (Word, Power Point / Electronic white board)

AS1 Stages of Economic development, evidences form Africa, where relevant

AS2 Economic development in South Africa, highlighting indigenous knowledge systems and impact of colonialism and imperialism

AS3 Money and banking

AS4 Composition of SA population and labour force, and impact of HIV/Aids

**Grade 11**

-

**Grade 12:** Web search

AS2 South Africa's industrial development policies

AS3 South African international trade policies

SA's role and relative economic importance in Africa

**Learning Outcome 4: Contemporary Economic Issues**

**GENERAL TEACHING AND LEARNING STRATEGIES:**

\* Regular (daily access) Web search of current economic issues – especially News paper articles etc on suitable web-sites – presentation thereof by means of Power Point / electronic white board.

\* Participation in Economics related competitions (e.g. Johannesburg Stock exchange, etc.)

\* Monitoring of quantitative elements in Economics (e.g. prices of fuel, consumer items, bond rates, bank rates on suitable web-sites, and calculate (excel) trends, and present (e.g. Power Point/electronic whiteboard.)

**Topics:**

**Grade 10 AS1:** Unemployment, economically marginalised persons

AS2: Labour relations and dispute resolution mechanisms (e.g. Trade unions), including labour rights and conventions

AS3: Reconstruction of SA economy after 1994

**Grade 11 AS1:** Poverty: characteristics, causes and possible solutions

AS2: Globalisation

AS3 Problems of environmental deterioration and insensitive resource exploitation in SA

**Grade 12 AS1:** Inflation, policies used to combat it

AS2: Economic importance of Tourism to SA / importance of indigenous knowledge systems

AS3: Environmental sustainability – recent international agreements in this regard (e.g. Rio de Janeiro and Johannesburg summits)

The aspect of this subject which is most appropriate to the use of computers is:

**\* Monitoring of daily economic issues on news paper & financial magazine web-sites (one topic per learner per year)**

**\* Web search on curriculum related topics, as mentioned above. Formatting of rough work of research projects/assignments on computer by learners, using MS Word, inserting Pictures, Tables, graphs etc (Grade 10 – 5 Assessment standards for all learners – grade 11 and 12: 2 research AS's per year)**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

- **Power Point presentations**
- **Projects/assignments prepared on MS Word etc**

Suggested software for use in this subject:

**PACE programme – grade 10 career investigation**

Suggested URLs for websites for use in this subject:

**Economics subsite on the WCED Curriculum site**

<http://curriculum.wcape.school.za/site/33>

**Bized**

<http://www.bized.ac.uk>

**Economics & Business Educator's Association**

<http://www.ebea.org.uk>

**Economics Network**

<http://www.economics.ltsn.ac.uk>

**Department of Trade and Industry**

<http://www.thedti.gov.za/>

**Department of Environmental Affairs and Tourism**

<http://www.environment.gov.za/>

**Cape Town Chamber of Commerce**

<http://www.capechamber.co.za/>

**Chamber of commerce and Industry**

<http://www.chamsa.org.za/>

**Johannesburg Stock Exchange**

<http://www.jse.co.za/>

**South African Revenue Service**

<http://www.sars.gov.za/>



**Broad based Economic Empowerment (BEE)**

<http://www.bee-smme.co.za/index.htm>

**Gauteng Economic Development**

<http://www.geda.co.za/>

National Treasury

<http://www.treasury.gov.za/>

## ELECTRICAL TECHNOLOGY

### ICT INTEGRATION FOR GRADES 10-12

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Grade 12 Learning Outcome 3 Assessment Standard 10:**

**We know this when the learner is able to combine logic concepts as an introduction to programmable control**

**Grade 12 Learning Outcome 3 Assessment Standard 12:**

**We know this when the learner is able to explain the operating principles and application of three-phase motors and control.**

**Grade 12 learners would benefit significantly by using a computer to achieve the above learning outcomes & assessment standards for computer control, e.g. Programmable Logic Controller (PLC) and programming of a Programmable Integrated Circuit (PIC) have become daily activities in industry. Pedestrian crossings, microwave ovens, music centres, DVD/CD players, washing machines, irrigation systems, and burglar alarms are but a few of the items in the learners' environments that they use in their daily routines. However, Grades 10 and 11 learners would also benefit from hands-on experience of simulating such systems to give them a better understanding of the impact of programmable control in modern society.**

The aspect of this subject which is most appropriate to the use of computers is

- 1. By using the bottom range of PLCs (like for instance the Mitsubishi Alpha range) Grade 10 to 12 learners will be able to simulate ALL the logic concepts demand of the NCS. (10.3.10; 11.3.10 & 12.3.10)**
- 2. By using a computer aided program (like Edison / Tina Pro / Crocodile clips)**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**A print out of readings, data, graphs and diagrams of the control system will be acceptable. (e.g. Listing of instructions / ladder diagram and circuit diagram of a pedestrian crossing. Listing of instructions / ladder diagram and circuit diagram of an up / down system with interlocks at upper and lower levels.**

Suggested software for use in this subject:

**Edison Multimedia Lab for Exploring Electricity and Electronics** (See <http://www.edisonlab.com> for further information

**Tina Pro**

**Crocodile clips for Technology**

**A PLC program, e.g. the Mitsubishi Alpha range, Müller or Siemens.**

Suggested URLs for websites for use in this subject:

**Electronics Workbench**  
<http://www.electronicworkbench.com>

**How electronic gates work**

<http://electronics.howstuffworks.com/digital-electronics.htm>

**Preparing an SMS reader**

<http://www.smspower.org/smsreader/prepare.html>

**Edison multimedia program**

<http://www.edusoft.co.za/edison.htm>

**Crocodile Clips**

<http://www.crocodile-clips.com>

**How stuff works**

<http://howstuffworks.com>

## ENGINEERING GRAPHICS & DESIGN

### ICT INTEGRATION FOR GRADES 10-12

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Grade 10 Learning Outcome 4 Assessment Standard 2& 3**

**We know this when the learner is able to produce basic CAD drawings**

**Grade 11 Learning Outcome 4 Assessment Standard 2 & 3**

**We know this when the learner is able to produce advanced CAD drawings.**

**Grade 12 Learning Outcome 4 Assessment Standard 2 & 3**

**We know this when the learner is able to produce complex CAD drawings.**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**The practice in industry and in the drawing office is to move away from paper-based drawings. The focus has become increasing more towards CAD generated drawings. In order to make education relevant to the world of work it is essential that learners be exposed to the current technologies.**

The aspect of this subject which is most appropriate to the use of computers is

**Executing Civil, Mechanical and Electrical drawings using Computer Aided Drawing software.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**CAD drawings**

Suggested software for use in this subject:

**AutoCAD**

**AllyCAD**

**CADDIE**

**OR any other suitable CAD package**

Suggested peripherals for use in this subject, e.g. sensors, whiteboards, data projectors, etc

**A3 printer, data projector, interactive white board**

Suggested websites/facilities for teacher training:

<http://curriculum.wcape.school.za/site/35/page/view/>

**ENGLISH**  
**ICT INTEGRATION FOR GRADES 10-12**

The four Learning Outcomes have the function of developing computer literacy through constant interaction.

**LO 1: Assessment Standard 2**

**LO 2: Assessment Standard 1**

**LO 3: Assessment Standard 1**

**LO 4: Assessment Standard 1**

**Learning Programme Guidelines document defines computer literacy as ‘the ability to use computers and to understand and create texts using a computer, such as computer games; multimedia texts that incorporate written text, visual images and sound; graphic texts and emails’.**

The aspect of this subject which is most appropriate to the use of computers is:

- **All 4 Learning Outcomes play a pivotal role in language acquisition and can also be promoted by means of software.**
- **Skills and content knowledge development**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Listening and Speaking activities**

**Reading strategies based on various text forms**

**Writing and presenting – planning skills, writing strategies and techniques and presenting of final draft**

**Language exercises**

**NB: It is important that users of software should always be aware of the spelling and grammar that is used.**

Suggested software for use in this subject:

**Readers are Leaders**

**EYE Read**

**Text Detective**

**Literacy Bank**

**Young Writer's Workshop**

**Smart Ideas**

**Inspiration**

Suggested URLs for websites for use in this subject:

**There are many English sites. A suggested start is to focus on WCED curriculum development website and on international ministries.**

- **WCED curriculum development web site**  
<http://curriculum.wcape.school.za/>
- **English website:**  
<http://curriculum.wcape.school.za/site/36/page/view>
- **English Poetry Site**  
<http://pix.za/barefoot.press/>

Suggested websites/facilities for teacher training:

- **WCED curriculum development web site**  
<http://curriculum.wcape.school.za/>
- **WCED English website:**  
<http://curriculum.wcape.school.za/site/36/page/view>
- **Molteno Project**  
<http://www.molteno.co.za/index.asp>

**HEIs (partnership with WCED for INSET through websites)**

**GEOGRAPHY**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Learning Outcome 1: According to National Senior Certificate requirements**

**Learning Outcomes 2 and 3 if used effectively**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Learning Outcome 1: According to National Senior Certificate requirements**

**Learning Outcomes 2 and 3 if used effectively**

The aspect of this subject which is most appropriate to the use of computers is

**General Geographic Techniques**

**Entire curriculum**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Spreadsheets**

**GIS generated documents e.g. maps, graphs, tables, cross profiles, long profiles, sketches, diagrams**

Suggested software for use in this subject:

- **Word processing**
- **Spreadsheets**
- **Web access**
- **Email**
- **Excel, including MS Map**
- **GIS**

Suggested URLs for websites for use in this subject:

**Google Earth**

<http://earth.google.com/>

**ESRI – GIS and mapping software**

<http://www.esri.com/>

**Geomatica GIS software**

<http://www.geomatica.co.za/>

**Department of Environmental Affairs and Tourism**

<http://www.environment.gov.za/>

Click on maps link

**Department of Water affairs and Forestry**

<http://www.dwaf.gov.za/>

**South African Weather Service**

<http://www.weathersa.co.za/>

Suggested websites/facilities for teacher training:

<http://curriculum.wcape.school.za/site/39/page/view>



## HISTORY

### ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**LO 4: Heritage. All assessment standards. There are very good sites dealing with heritage/monuments and memorials that could be used when working with this Outcome.**

**LO 1: Using a variety of sources – more and more good historical sources can be found on the web. This would be for learners and for teachers needing sources to use in lessons.**

The aspect of this subject which is most appropriate to the use of computers is

**There are some software packages that are being produced that are suitable for our curriculum. But apart from teaching and learning in the classroom, the use of computers and internet access can be integrated into professional development for teachers.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**PowerPoint presentations developed by learners; their own work done on the computer e.g. research projects or other assignments generated by the use of computers and other software. The important thing is that the work needs to be authentic and fall within the criteria for that particular assignment.**

Suggested software for use in this subject:

**CD-ROMs that have good content suitable for the content areas of the curriculum.**

Suggested URLs for websites for use in this subject

**WCED Curriculum website:**

<http://curriculum.wcape.school.za/>

Click on History: FET

**Nuffield Foundation History**

<http://www.nuffieldfoundation.org.uk/>

Classroom resources, lesson plans, and learners' work. A good place to get teaching ideas.

**The World War 2 panorama project that is photographing memorials and landmarks of WW2**

<http://www.WW2panorama.org/>

An interesting site for Learning Outcome 4.

**Imperial War Museum**

<http://www.iwm.org.uk>

Interesting information about exhibitions and teachers resources about a range of topics.

**Propaganda images from Nazi Germany**

[www.calvin.edu/academic/cas/gpar](http://www.calvin.edu/academic/cas/gpar)

**Facing History and Ourselves**

<http://www.facinghistory.org/>

**South African History Online**

<http://www.sahistory.org.za/>

**South African History Archive**

<http://www.wits.ac.za/saha/>

**South African Labour History**

<http://www.labourhistory.org.za/>

**HOSPITALITY STUDIES**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standard

**LO. 1 AS 1, 2, 4 and 5 Grade 10, 11 and AS 1 and 2 in Grade 12**

**LO. 2 AS 1- 5 Grade 10, and AS 1, 3, 4 in Grade 11, and ass. 2 – 3 Grade 12**

**LO. 3 AS 1- 5 Grade 10, AS 1, 5 Grade 11, and AS 1 – 2 and 4 – 5 Grade 12**

**LO.4 AS 1 – 5 Grade 10, AS 1 – 4 in Grade 11 and AS 1 – 4 in Grade 12**

The aspect of this subject which is most appropriate to the use of computers is

**Research and projects, and practical**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Cover pages and computer icons and pictures**

Suggested software for use in this subject:

**At present there is no specific software applicable to the subject.**

Suggested URLs for websites for use in this subject:

**Hospitality website:**

<http://curriculum.wcape.school.za/site/65/page/view>

**South African Chefs' Association**

<http://www.saca.co.za>

**Gourmet SA online**

<http://www.gourmetsa.com>

**Media 24 Ltd**

<http://www.food24.co.za>

**SABC 2**

<http://www.pasella.com>

**SETA for Hospitality and Tourism in South Africa**

<http://www.theta.org.za>

**Hospitality News**

<http://www.hospitality.co.za>

**South African restaurants)**

<http://www.restaurants.co.za>

**WINE – online magazine**

[www.winemag.co.za](http://www.winemag.co.za)

**University of the Western Cape**

<http://www.uwc.ac.za>

**INFORMATION TECHNOLOGY**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners must use a computer to achieve these learning outcomes & assessment standards:

**LO 1: Hardware and System Software (and most of its Assessment Standards)**

**LO 2: e-Communication (and all its Assessment Standards)**

**LO 3: Social and Ethical Issues (and most of its Assessment Standards)**

**LO 4: Programming and Software Development (and all its Assessment Standards)**

- **As Information Technology is about the development of computer applications by using current development tools, as well as activities that deal with problem solving through information management and communication, most of the LOs and ASs demand the use of computers.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

- **Most of the items in the Programme of Assessment, as well as daily assessment would be electronic.**
- **Comment: There is strong debate around the use of electronic assessment tasks to assess the "theory aspects" of the subject where the software automatically mark and generate the marks.**

Suggested software for use in this subject:

- **Operating Systems**  
Windows platform: Windows 98, (preferably XP Professional)  
Open Source platform: Linux Suse, Linux Redhat, Linux Fedora or any recent Linux distribution
- **Office automation**  
Microsoft: MS Office Professional  
Database Package: MS Access  
Anti-Virus Package: Norton Anti-Virus  
Open Source: Open Office, Star Office  
Optional Packages: any suitable publisher and/or web development software  
Database Package: REKALL, MySQL
- **Web-authoring:**  
Frontpage  
DreamWeaver  
Optional Package: MS Publisher
- **Internet Browsers and Email software**  
Microsoft: Explorer, Netscape or Opera  
E-Mail: Pegasus or Outlook Express  
Open Source: Mozilla, any suitable browser  
E-mail: any suitable package
- **Java IDE (JCreator, Ready to Program, JGrasp) Java Development Kit (JDK 1.5)**
- **Data recovery software**

Suggested URLs for websites for use in this subject:

**Information Technology subsite on the Curriculum Website:**

<http://curriculum.wcape.school.za/site/119/page/view/>

**Other Websites**

<http://www.tomshardware.com/>  
[www.pcwebopedia.com](http://www.pcwebopedia.com)  
[www.news.com/Categories/Index/0,3,2,0Q.html](http://www.news.com/Categories/Index/0,3,2,0Q.html)  
[www.aldridge.com](http://www.aldridge.com)  
[www.ora.com/reference/dictionary/](http://www.ora.com/reference/dictionary/)

**Memory and Cache (start with the first one)**

[www.pcguide.com/ref/ram/logic-c.html](http://www.pcguide.com/ref/ram/logic-c.html)  
[www.mindspring.com/~12co/CacheFAQ.html](http://www.mindspring.com/~12co/CacheFAQ.html)

**IDE and SCSI**

<http://hardware.pairnet.com/scsiide>  
<http://sophia.dtp.fmph.uniba.sk/pchardware/idescsi.html>

**Smartcards**

[www.cip.com.au/scard/](http://www.cip.com.au/scard/)

**Speech recognition (voice-writing)**

<http://speakingolutions.com>  
<http://www.dragonsys.com>  
(Source: Business Education Forum, February 2002 (<http://www.nbea.org>))

**Assistive technology**

<http://nlbuk.org/access/braillehist.htm>  
<http://nyise.org/braille.htm>  
<http://www.abledata.com>  
<http://www.fentek-ind.com>

**Handheld computers (palmtops)**

<http://www.palm.com/education/>  
<http://www.palm.com/products/handhelds/>

**Keyboard instruction**

<http://www.dmoz.org/Computers/Software/Educational/Typing>  
<http://ktouch.sourceforge.net>  
<http://www.qwerty.com>

**ISIXHOSA**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**LO 2: ASS 1, 2 & 3**

**LO 3: ASS 1, 2 & 3**

**LO 4: ASS 1, 2 & 3**

**The computer would be useful in a wide range of texts such as the ff: transactional texts, creative texts and literary texts, skimming, scanning, editing and proofreading**

The aspect of this subject which is most appropriate to the use of computers is:

**Research using the Internet, creative and transactional writing**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Essays and short pieces**

Suggested software for use in this subject:

**EYE Read**

**African Voices**

**Literacy Banks (in the case of Second Additional Language)**

Suggested URLs for websites for use in this subject:

**IsiXhosa subsite on Curriculum website**

<http://curriculum.wcape.school.za/site/58/page/view>

**IsiXhosa reference sites**

<http://www.africanlanguages.com/xhosa/>

<http://isixhosa.co.za/>

<http://www.cyberserv.co.za/users/~jako/lang/xho.htm>

**isiXhosa Wikipedia**

[http://xh.wikipedia.org/wiki/Main\\_Page](http://xh.wikipedia.org/wiki/Main_Page)

**isiXhosa Google**

<http://www.google.com/intl/xh/>

**LIFE ORIENTATION**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners must use a computer to achieve these learning outcomes & assessment standards:

**LO 1 AS 1 - 4: Personal Well-being. Today's Choices II software for learners deals with this LO.**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**LO 1: Personal Well-being: AS 1 – 4**

**LO 4: Career and Career Choices: AS 1 - 3**

The following computer generated items are acceptable in a learner's portfolio in this learning area or phase: \* **to be determined by the teacher, based on the activities included in the learning programme**

Suggested software for use in this learning area or phase:

**PACE CD-ROM with Careers Handbook and Learner's Workbook**

**Today's Choices II CD-ROM, with video cassette, Educator's Guide and Learner's Book.**

Suggested URLs for websites for use in this learning area or phase:

**Life Orientation subsite of WCED curriculum site**

<http://curriculum.wcape.school.za/site/42/page/view/>

**PACE**

<http://www.pacecareers.com>

**Career Voyager**

<http://www.careervoyages.com>

**Career planning**

<http://www.careerplanning.about.com>

**Mayo clinic**

<http://www.mayoclinic.com>

**Online centre – student health and fitness**

<http://www.teenactiv.co.za/>

**Career and Lifeskills Resources**

<http://www.career-lifeskills.com>

**Teenactiv**

<http://www.teenactiv.co.za/>

**Health 24.com**

<http://www.health24.com>

**Love life youth site**

<http://www.lovelife.org.za/>



**Department of Sport and Recreation**

<http://www.srsa.gov.za/>

**Department of Health**

<http://www.doh.gov.za/>

**Super sport site**

<http://www.supersport.co.za/>

**LIFE SCIENCES**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Learning outcomes 1 (assessment standards 1 – 3) and Learning outcomes 2 (assessment standards 1 – 3)**

**Although it is not compulsory, it would be to their advantage to use certain software programs such as simulations, programs where they can vary the variables in an experiment, animations, drawings, electron micrographs from the internet, Excel to record results and plot graphs, etc.**

The aspect of this subject which is most appropriate to the use of computers is

**Simulations & animations: Processes and mechanisms**

**Electron micrographs from the internet**

**Drawings, images, flow charts and pictures from the internet**

**Dissections – software programme are available**

**Experiments – to vary the different variables (pH, temperature, oxygen and carbon dioxide concentration, irrigation, fertilisation)**

**Graphing – plot different types of graphs (line, histograms, pie charts)**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Graphs, tables, illustrations, flow charts, electron micrographs in research projects as long as they are acknowledged.**

**Suggested software for use in this subject:**

**Multimedia Science School**

**Crocodile clips**

**Dataharvest**

Suggested URLs for websites for use in this subject:

**Biology subsite of WCED Curriculum website**

<http://curriculum.wcape.school.za/site/27/page/view/>

**Useful links from the Biology website:**

<http://curriculum.wcape.school.za/site/27/page/view/632>

**University of Western Cape Internet Bio-Ed Project**

[http://www.botany.uwc.ac.za/sci\\_ed/](http://www.botany.uwc.ac.za/sci_ed/)

**Science in Africa - Africa's First On-Line Science Magazine website:**

<http://www.scienceinafrica.co.za/index.htm>

**Natural Sciences website:**

<http://curriculum.wcape.school.za/site/49/page/view/662>

**Australia:**

<http://www4.boardofstudies.nsw.edu.au/go/higher-school-certificate/biology>

**Blended learning**

<http://www.schools.nsw.edu.au/learning/yrk12focusareas/learntech/blended/index.php>  
[www.biointeractive.org](http://www.biointeractive.org)

**USA:**

**Scientific modelling:**

<http://www.wcer.wisc.edu/ncisla/muse/>

<http://www.imagiworks.com>

<http://www.education.ti.com>

<http://www.hrw.com>

<http://www.nsta.org>

<http://www.wardsci.com>

<http://www.teachersource.com>

**Online Videos**

<http://www.racerocks.com/>

<http://www.pbs.org/wgbh/nova/programs.html>

<http://www.adventuretv.com/>

<http://www.channel4.com/learning/>

**UK**

<http://www.sycd.co.uk>

<http://www.tpthould.dabsol.co.uk>

<http://www.educationusingPowerPoint.org.uk>

Payment required to download PPT presentations but one can preview them

[www.senteacher.org/shot/bonenames.php](http://www.senteacher.org/shot/bonenames.php)

[www.defra.gov.uk/environment/statistics/eiyp/intro.htm](http://www.defra.gov.uk/environment/statistics/eiyp/intro.htm)

<http://www.sheffcol.ac.uk/links/Science/>

[www.biology4all.co.uk](http://www.biology4all.co.uk)

<http://www.dataharvest.com>

<http://www.crocodile-clips.com>

**More useful links ...**

<http://www.google.co.za/>

Use this search engine to search by topic, such as **mitochondrion**

<http://www.animalearn.org>

<http://www.eurekaalert.org/>

<http://www.nabt.org>

<http://www.scilinks.org>

<http://www.granada-learning.com/>

## MATHEMATICS AND MATHEMATICAL LITERACY

### ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**The use of a computer in all learning outcomes and assessment standards will obviously enhance teaching and learning, especially where the mathematical concepts depend on visual representation. This is especially so when dealing with graphs (LO 2 and 4) and Space, Shape and measurement (LO 3)**

The aspect of this subject which is most appropriate to the use of computers is

**Drawing graphs and exploring geometrical shapes and patterns, especially transformations and tessellations**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Graphs and geometrical shapes and patterns, Excel spreadsheets, learner assessment activities**

Suggested software for use in this subject:

**Office applications such as MS Word e.g. DRAW and EQUATIONS EDITOR and MS Excel**

**Dynamic geometry packages such as Geometer's Sketchpad, Graph Freeware**

<http://www.padowan.dk/graph/index.html>

**MasterMaths**

**MathPro**

**CAMI**

Suggested URLs for websites for use in this subject:

**Mathematics homepage on the WCED Curriculum website:**

<http://curriculum.wcape.school.za/site/46/page/view/>

**Curriculum resources on the Web from the Mathematics homepage:**

[SCORE Mathematics Lessons](http://score.kings.k12.ca.us/lessons.html)

<http://score.kings.k12.ca.us/lessons.html>

These SCORE Mathematics Lessons have been written by teachers selected to participate in SCORE Mathematics workshops.

**The Trillia Group - Basic Concepts of Mathematics**

<http://www.trillia.com/zakon1.html>

<http://www.nctm.org/>

Dedicated to improving the teaching and learning of Mathematics

**The UKMT Web Site**

<http://www.mathcomp.leeds.ac.uk>

Mathematics competitions in the UK for 12-18 year old school pupils.

**The Organic Mathematics Home Page**

<http://testapp.mathforum.org:8010/library/view/3094.html>

**Discrete Mathematics -- from MathWorld**

<http://mathworld.wolfram.com/topics/DiscreteMathematics.html>

Wolfram Web Resources, Astronomy Biography Chemistry, Mathematics Physics.

**Appetizers and Lessons for Mathematics and Pattern Based Reason**

<http://whyslopes.com/>

Appetizers and Lessons for Mathematics and Reason - a thought-provoking site to challenge how U learn or teach.

**Mathematics Problem Solving - Free Worksheets**

<http://www.rhlschool.com/math.html>

Search RHL School and EdHelperNet: Mathematics Computation. Times Facts Sheet. Sites for Teachers.

**NASA - AMATYC - NSF Mathematics Explorations I and II**

<http://www.ccc.commnet.edu/ta/>

Mathematics Explorations I & II.

**Mathematical Atlas: A gateway to Mathematics**

<http://www.math-atlas.org>

Dave Rusin's survey of research-level **mathematics**, with introductory articles for non-mathematicians

**Mathematics**

<http://id.mind.net/~zona/mmts/mmts.html>

More Mathematics than Science. ... Expression Evaluation. The Function Institute. The Geometry Section. Graph Paper. Miscellaneous Mathematics. ...

**Content Standards for Alaska Students - Math**

<http://www.educ.state.ak.us/ContentStandards/Math.html>

Understanding mathematical facts, concepts, principles, and theories.

**Project MATHEMATICS!**

<http://projectmathematics.com>

Project **MATHEMATICS!** Produces videotape-and-workbook modules that explore basic topics in high school Mathematics

**Quia - Mathematics - top 20 activities**

<http://quia.com/dir/math/>

Educational activities for teaching Mathematics including concentration, matching, flash cards, etc

**NCTM Illuminations**

<http://illuminations.nctm.org/>

This site is designed to "illuminate" the new NCTM Principles and Standards for School Mathematics.

**Millennium Mathematics Project**

<http://mmp.maths.org/>

A national (UK) initiative based in Cambridge. Its broad goal is to help people of all ages and abilities.

<http://dir.yahoo.com/Science/Mathematics/>

This has a weekly selection of graphically interesting Mathematics sites. ...

<http://www.nyu.edu/pages/mathmol/>

This site provides students, teachers and researchers with the basic concepts in Mathematics

### **K-8 Education Place | Mathematics Center**

<http://www.eduplace.com/math/>

The Mathematics Center provides Maths-related resources that include professional development, intervention, data place, brain teasers, textbook support, math links, etc.

### **Smile Program Mathematics**

<http://www.iit.edu/~smile/mathinde.html>

The SMILE website has a collection of almost 200 single concept lessons.

### **Patterns in Mathematics**

<http://www.learner.org/teacherslab/math/patterns/>

Teachers explore how patterns occur in numbers and in words in this interactive lab.

### **International Mathematics Olympiad**

<http://olympiads.win.tue.nl/imo/>

Past International Mathematical Olympiads and links to related web sites.

### **Fun Mathematics Lessons by Cynthia Lanius**

<http://math.rice.edu/~lanius/Lessons/>

Mathematics lessons for elementary, middle, and high school including geometry, fractions, and algebra.

### **e-Tutor, Inc. Empowering Classrooms... Enriching Minds**

<http://www.e-tutor.com/>

Anytime, Anywhere, Everyday Learning e-Tutor offers students, parents and educators the vision, tools and resources for initiating and implementing Internet-based curriculum for K-12.

### **NCTM e\_Resources - Journal Home**

[http://my.nctm.org/eresources/journal\\_home.asp?journal\\_id=1](http://my.nctm.org/eresources/journal_home.asp?journal_id=1)

Journal for Research in Mathematics Education.

### **California Mathematics Council**

<http://www.cmc-math.org/>

The Story on Integrated Mathematics Curricula.

### **Colourful Mathematics**

<http://www.math.ucalgary.ca/~laf/colorful/colorful.html>

Educational software presents advanced Mathematics to K-12 students in a game-oriented approach

### **Mathematics Lesson Plans**

<http://col-ed.org/cur/math.html>

Lesson Plans. Math - Elementary (K-5). math01.txt Math review on concept and facts (4-6) math02.txt Learning multiplication

### **Mathematics from FOLDOC**

<http://wombat.doc.ic.ac.uk/foldoc/contents/mathematics.html>

Mathematics. Related entries include: abscissa; accuracy; Active Language; additive; affine transformation; aleph 0; algebra; Algebraic ...

### **Mathematics, Science & Technology Education at UIUC**

<http://www.mste.uiuc.edu/courses/mat764fa05/index.php>

Office of Mathematics, Science, and Technology Education for K-12.

### **Pi Mathematics**

<http://archive.ncsa.uiuc.edu/Edu/RSE/RSEorange.html>

A collaborative project, using the concept of PI as the focus.

**South African Mathematics Society (SAMS)**

<http://www.cam.wits.ac.za/sams/>)

<http://www.education-world.com/math/>

A website with mathematics resources.

**MECHANICAL TECHNOLOGY**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners must use a computer to achieve these learning outcomes & assessment standards:

**Grade 10 Learning Outcome 3 Assessment Standard 4**

**Grade 11 Learning Outcome 3 Assessment Standard 4**

**Grade 12 Learning Outcome 3 Assessment Standard 4**

**When working with a lathe the learner must be able to use the Computer Numeric Control (CNC) programmable lathe to perform a task.**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Possibility is to get a simulation program and use it on the computer so that the class can participate in programming skills.**

The aspect of this subject which is most appropriate to the use of computers is

**CNC: When working with a lathe or a milling machine.**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**A print out of readings, data, when using CNC**

**Drawing of the final project.**

Suggested software for use in this subject:

**Simulation programme: CAM/CAD Design, Sangari SA**

**Newton**



**MUSIC**  
**ICT INTEGRATION FOR GRADES 10-12**

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**LO 1 Music Performance and Presentation**

**AS: Selecting, identifying, working and using available technology ,e.g. necessity placing and using microphones for amplification of sound)**

**LO 2 Composition and Arrangement**

**AS: Use of available technology**

**LO 3 Musical Literacies**

**LO 4 Critical Reflection**

**Use of available music programs on Internet and other software**

The aspect of this subject which is most appropriate to the use of computers is

**Musical performance, Composition, Arrangement and Theory of Music, Research in General Musical Knowledge**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Own compositions and arrangements**

**Research tasks**

Suggested software for use in this subject:

**Music notation:**

**Finale**

**Sibelius**

**Sequencing:**

**Cake walk**

**Cue-base**

**Recording:**

**Audacity** free download from <http://audacity.sourceforge.net/>

**Pro Tools** free download from <http://www.digidesign.com/ptfree/>

Suggested URLs for websites for use in this subject:

**Music subsite of the Curriculum Development website**

<http://curriculum.wcape.school.za/site/48/page/view>

**Search engine**

<http://www.google.co.za/>

**International Library of African Music**

<http://ilam.ru.ac.za/>

**Associated Board of the Royal Schools of Music**

<http://www.abrsm.org/>

**Indiana University Jacobs School of Music**

<http://www.music.indiana.edu/>

**Trinity College, London**

<http://www.trinitycollege.co.uk/>

**Rockschool (UK)**

<http://www.rockschool.co.uk/>

**University of South Africa Department of Music**

<http://www.unisa.ac.za/default.asp?Cmd=ViewContent&ContentID=2021>

**African Music**

<http://www.dancedrummer.com/>

**Music Theory**

<http://www.musictheory.net/>

**Rhythmic Dictation**

<http://www.teoria.com/>

**Musical Reference**

<http://www.design-bysarah.co.uk/oulinks/courses/a214/a214notes.htm>

**Music for schools and churches**

<http://www.duckmusic.free-online.co.uk/>

**Sky Music Studio**

<http://www.skysun.co.za/s/index.htm>

## PHYSICAL SCIENCES

### ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer to achieve these learning outcomes & assessment standards:

**Yes, but learners must have access to appropriate subject specific software and the Internet. The Internet has the potential to impart the greatest knowledge gain immediately to learners.**

The aspect of this subject which is most appropriate to the use of computers is

- **Data handling and interpretation**
- **Solving problems**
- **Communicating and presenting information**
- **The acquisition and construction of science knowledge**
- **Subject related research**
- **Demonstrations of phenomena, experiments, tests and content**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

- **Spread sheets**
- **Worksheets**
- **Drawings and graphics**
- **Assessment tasks: both instruments and tools, including instructions and learners answers / responses**

Suggested software for use in this subject:

1. **Data Harvest equipment and software** for recording and analysing measurements
2. **Crocodile Clips** for interactive experimental work
3. **Physics** by Riverdeep Interactive learning: For virtual teaching and learning online using Physics Explorer3.04
4. **Physics** by Wolwendrift Trust: For step by step guidance to learning concepts
5. **FET CD** by MULTICHOICE: For mediating and addressing misconceptions in the key areas of science such as energy
6. **GET Ahead MSE:** For Grade 6 and 7 Math, Science and English
7. **Corel Draw:** For drawing any object in a professional way.
8. **Fun with Polymers:** FET content by Jaco de Kock - Cape University of Technology.

Suggested URLs for websites for use in this subject:

**Site for NSW online:**

<http://hsc.csu.edu.au/chemistry/core/monitoring/chem943/943net.html>

**Weblinks for Science**

<http://www.sheffcol.ac.uk/links/Science/>

**Dictionary of units of measurement**

<http://www.unc.edu/~rowlett/units/index.html>

**National Institute of Standards and Technology (NIST)**

<http://physics.nist.gov/cuu/units/>

For constants, units and uncertainty

**Plastic polymers**

<http://www.psrc.usm.edu/>

**Physical Sciences web site with search options**

<http://www.psigate.ac.uk>

**RELIGION STUDIES**  
**ICT INTEGRATION FOR GRADES 10-12**

The aspect of this subject which is most appropriate to the use of computers is

**Research tasks**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Research tasks**

Suggested software for use in this subject:

**Electronic encyclopaedias**

Suggested URLs for websites for use in this subject:

**Teaching about Religion**

<http://www.teachingaboutreligion.org>

**Directory of online resources for Religious studies**

<http://www.academicinfo.net/Religion.html>

**Religions in Brief**

<http://www.hinduism.co.za/religion.htm>

## TOURISM

### ICT INTEGRATION FOR GRADES 10-12

Learners would benefit significantly by using a computer when engaging in a wide range of learning activities in Tourism, but they must use computers to achieve these learning outcomes & assessment standards:

**LO 3 AS 1, 2 and 4 in Grade 10; AS 1, 2, 3, and 5 in Grade 11; and AS 1, 2, 3, 4, 5, 6 in Grade 12: Use of the Internet, a GIS and/or electronic atlas would greatly enhance the learners' skills and understanding required to meet these assessment standards of this outcome.**

**LO 4 AS 1 and 4 in Grade 10; AS 3 and 5 in Grade 11; AS 5 in Grade 12.**

The aspects of this subject which are most appropriate to the use of computers is

- **Finding and handling relevant local, national and international information from geographical, cultural, heritage and commercial sources on the Internet**
- **Using online travel and accommodation websites to source information.**
- **Using a GIS to access information useful in planning for travel and tourism.**
- **Using mind-mapping software for planning and organising**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject:

**Schedules, maps, research tasks**

Suggested software for use in this subject:

**Inspiration**

**Smart Ideas**

**ESDRI (GIS)**

**Geomatica (GIS software)**

Suggested URLs for websites for use in this subject:

**South African Tourism**

[www.southafrica.net](http://www.southafrica.net)

**World Tourism Organisation**

[www.world-tourism.org](http://www.world-tourism.org)

**SATOUR**

[www.satour.info/](http://www.satour.info/)

South Africa Accommodation and Destination Guide

**South African Tourism Institute**

<http://www.sati.web.za/>

**Department of Environmental Affairs and Tourism**

[www.environment.gov.za](http://www.environment.gov.za)

**Tourism Grading Council of South Africa**

[www.tourismgrading.co.za](http://www.tourismgrading.co.za)

**Global Travel and Tourism Programs**

<http://www.gttp.org/>

**Getaway - Online**

[www.getawaytoafrika.com](http://www.getawaytoafrika.com)

**Weg-tydskrif – elektroniese weergawe**

[www.weg.co.za](http://www.weg.co.za)

**UNESCO**

[www.unesco.org](http://www.unesco.org)

For information about World Heritage Sites

**Cape Town & Western Cape**

[www.capetourism.org](http://www.capetourism.org)

Official visitor, events & business website

**SETA for Tourism in South Africa**

[www.theta.org.za](http://www.theta.org.za)

**Google Earth**

<http://www.earth.google.com/>

**EQUIP**

<http://nbi.melange.co.za/welcome.php?pg=60>

Management of the Travel & Tourism Programme (TTP)

**Comprehensive guide to South Africa: Travel and Tourism**

[http://www.esouthafrica.com/Travel\\_and\\_Tourism/](http://www.esouthafrica.com/Travel_and_Tourism/)

## VISUAL ARTS

### ICT INTEGRATION FOR GRADES 10-12

The acquisition of IT skills in the Visual Arts is optional but should be considered to be part of the broader development of Visual Arts SKAVs but **MUST NEVER BE ALLOWED** to replace visual arts manual skills e.g.

**LO1 Conceptualising: AS 1 i, ii**

**LO2 Making: AS I: i, iii, iv**

**LO4 Visual Culture Studies: ii, iii**

Aspects of this subject which are most appropriate to the use of computers:

- **Skills & content knowledge development, ethics (plagiarism and intellectual copyright issues) and global enrichment**
- **Ability to use IT software in the conceptualising (LO1) making (LO2); and research in visual culture studies (LO 4) access to URLS design sites & research**

The following computer generated items are acceptable in a learner's portfolio of school-based assessment in this subject (depending on design option selected for study):

**Sub-task(s) in design workbook: e.g.**

- **Computer generated items may contribute to Visual Arts processes but they should not constitute the whole process or the final product(s)**
- **Exploration and experimentation with manipulation of images**
- **Ethics and intellectual copyright:**
- **Issues concerning the manipulation of images to support ideology, beliefs, propaganda etc**
- **Presentation of on going research and content knowledge e.g. as a PPT presentation**

Suggested software for use in this subject: there are many design based applications e.g.

**Adobe Creative Suite**

**CorelDraw**

**GIMP**

Suggested URLs for websites for use in this subject:

**There are many design and gallery sites. A suggested start is to focus on WCED curriculum development web site where there are further links:**

<http://curriculum.wcape.school.za/site/103/pgg3/view>

**National Department of Education**

<http://education.pwv.gov.za/content/documents/>

**HEIs in South Africa**



[http://africa.msu.edu/s\\_afr\\_un.htm](http://africa.msu.edu/s_afr_un.htm)

**Universities and Universities of Technology in South Africa**

[http://africa.msu.edu/s\\_afr\\_un.htm](http://africa.msu.edu/s_afr_un.htm)

**Department of Arts and Culture**

<http://www.dac.gov.za/>

**Iziko Museums of Cape Town**

<http://www.museums.org.za/iziko/>

**Cape Peninsula University of Technology**

<http://info.cput.ac.za/prospectus/cluster.php?d=5>

**Content Resource for teachers**

<http://www.asai.co.za>

This site provides LTSM to support NCS Visual Arts (Visual Culture Studies LO4) and current 550 Art HG and Art SG History of Art and Practical SG research projects.

**Cape Gateway**

<http://www.capegateway.gov.za/>

**Google Search engine:**

<http://www.google.co.za/>

Look for International government education authority sites (secondary school design; design & technology education sites - UK, US, Australia, New Zealand, Canada, Japan, Korea etc)

**Appendix A**

**SOFTWARE PROFILE FOR NCS SUBJECTS  
(FET)**

<b>Evaluator:</b>		<b>Date:</b>			
<b>Title:</b>		<b>Publisher:</b>			
<b>Cost (where known):</b>		<b>Language(s):</b>			
<b>Subject(s):</b>		<b>Grades:</b>			
<b>Purpose of software</b> <i>Please tick as appropriate</i>	Information transfer	Drill & Practice		Simulation / case studies	
	Problem solving, calculation	Creative thinking / writing / graphics		Logic / critical thinking	
<b>For use by</b>	Individuals	Small Groups		Whole class / whiteboard	
<b>System Requirements:</b>	Windows	Linux			
<b>Content</b>	<b>Poor</b> <span style="font-size: 2em;">→</span> <b>Excellent</b>				
Relevant to NCS subject(s) above	1	2	3	4	N/A
Compatible with OBE methodologies	1	2	3	4	N/A
Information is accurate	1	2	3	4	N/A
Logical progression in conceptual development and content	1	2	3	4	N/A
Likely to arouse and maintain interest of learners	1	2	3	4	N/A
Interactive learner participation	1	2	3	4	N/A
Sufficient, relevant practice in appropriate skills	1	2	3	4	N/A
Language of instruction suitable for learners	1	2	3	4	N/A
Variation in activities, with increasing complexity	1	2	3	4	N/A
Freedom from cultural, racial, gender and language bias	1	2	3	4	N/A
Appropriate / adaptable for the South African context	1	2	3	3	N/A
<b>Presentation</b>					
Learning outcomes clearly stated	1	2	3	4	N/A
Easy-to-use screen instructions	1	2	3	4	N/A
Appropriate presentation format	1	2	3	4	N/A
Appropriate use of colour, sound and graphics	1	2	3	4	N/A
Appropriate learner control	1	2	3	4	N/A
Free of technical flaws	1	2	3	4	N/A
<b>Questions and Responses</b>					
Questions / required responses appropriate to learning outcomes	1	2	3	4	N/A
Appropriate evaluation of learner responses	1	2	3	4	N/A
Appropriate feedback to learner responses	1	2	3	4	N/A
Feedback to learner response provides remedial assistance where necessary	1	2	3	4	N/A
<b>Management</b>					
Allows customisation for individual learning needs	1	2	3	4	N/A
Allows learners to exit and resume at a later stage	1	2	3	4	N/A
Keeps learner performance record	1	2	3	4	N/A
Allows educator control	1	2	3	4	N/A

Provides testing for prior learning	1	2	3	4	N/A
Allows addition of own learning material	1	2	3	4	N/A
<b>Software meets the intended purpose relevant to the NCS</b>	1	2	3	4	
<b>Software is useful for teachers' own professional development in this subject</b>	1	2	3	4	N/A

**NCS subject learning outcomes / assessment standards addressed by the software:**

**Please list the content of the software (e.g. as indicated on the content page / menu):**

**General recommendation / Comments:**  
 [If software is recommended, please describe briefly how it could be used to support the subject.]

Signature:

## **Appendix B      TECHNICAL ASPECTS OF SOFTWARE FOR SCHOOLS**

This checklist has been adapted from that used by the Centre for e-Innovation to help you to decide whether the software you are considering purchasing is appropriate from a technical point of view. It could alternately be used to help you identify the problems involved in installing it on your school network or stand-alone computers, so that you can ask for assistance from the vendor or developer or helpdesk. You should check each of these points with the software vendor.

### **Support**

1. Does the developer or vendor provide support if needed?

### **Licensing**

2. Does the software license cost cover the whole school (site license) with or without teachers' home computers; or does it cover each venue, or each workstation or each user? Check on the server: some software might be licensed per CPU in the server?

### **Operating system**

3. Operating system compatibility: On what operating systems does the software run? (E.g. Windows 95 or Windows XP, Linux, thin client technology, other) Is it the same as your operating system or compatible with it?
4. If your school has a Linux platform and the software is Windows: Has this software been tested on a Windows emulator in Linux and does it function in the emulator after installation?

### **Installation**

5. On what media did you receive the software? (For example DVD, CD, floppy, or FTP)
6. Did you receive the latest version of the software?
7. Did the software have the relevant network and/or stand-alone installation documentation packaged with it?
8. If not, did you receive installation documentation separately or is it available on the vendor's/developer's web site?
9. If you received installation documentation and proceeded to install the software, did the installation procedures/setup work (i.e. without any tweaking)?
10. Is the software network able – can it function on a network without any security risks? That means that files do not need full access rights or write rights on the server to function, as this could compromise network security.
11. If the software is network able, is a network installation on the workstations possible? That means you can deploy the software from the server, even via AD (MSI technology), rather than installing it separately on each workstation.
12. After the installation of network software can you run the application from the workstation directly off the server, or is workstation installation also necessary (like client software or installing the full package on each work station)?

13. How would you rate the software installation - was it easy or difficult to install?
14. Once installed on the network does the software make use of LDAP Integration? Is separate registration of users necessary or does it get all user information from AD/NDS/Open LDAP?
15. When an installation has been completed (standalone or network), is tweaking necessary to make the software function correctly? For example, do you have to change some files or paths manually to a specific location to get the software functioning?
16. Are fixed drive mappings required to get the software functioning or does it make use of UNC paths? (Preferably, software should use UNC paths and automatically detect the server name)
17. Are specific scripts required/recommended to make it usable?
18. Are special policies required to make the software usable?
19. Are special profiles required to make the software usable?
20. Does the software allow for the use of mandatory user profiles.
21. Is it necessary to set up special rights on certain files to make the software usable? Do you need to set rights on the workstation like write rights in the Windows directory on specific files?
22. What are the security requirements for the software to function correctly on a server?  
Good - Only requires Read access to function;  
Medium - Requires mapped drives / Some files require full access to function;  
Bad - All files require full access to function correctly.
23. What are the security requirements for the software to function correctly on a workstation?  
Good - Only requires Read access to function;  
Medium - Requires mapped drives / Some files require full access to function, or some files are needed on the workstation for application to function correctly;  
Bad - All files need full access or need to be installed on the workstation.
24. Are the software installation and application free of technical flaws?
25. Do you think the developer should make the software installation and operation more user-friendly?
26. Would you recommend this software for use, notwithstanding technical flaws (e.g. software does not function correctly) or installation problems (e.g. setup is difficult or does not function correctly)?
27. What are the minimum system installation requirements on a workstation to allow the software to function on the system? (E.g. PII 266Mhz with 32MB of RAM and 60MB of HDD space)
28. What are the minimum system installation requirements on a server to allow the software to function on the system? (E.g. PII 266Mhz with 32MB of RAM and 60MB of HDD space)
29. Is the software dependent on the installation of specific service packs or components like DirectX, Flash (and specific versions), database engines like MySQL, SQL etc.

30. Does the software require audio in order for it to be fully optimized?
31. Does the software have printing support? (E.g. If something has to be printed, does it print on the default printer only or can different printers be selected?)

### **Language**

32. In what languages is the software available? Are there support facilities such as spelling and grammar checkers and a Thesaurus? If it is available in more than one language, is each language similarly supported?

Adapted from the Centre for e-Innovation document **Software Criteria Information Form; Doc Ver:1.2; Date:20/07/2005**

## **SOME FURTHER READING**

### **White Paper on e-Education: Transforming Learning and Teaching through Information and Communication Technologies**

Department of Education, 2004

Enquiries and/or copies:

Department of Education: Telephone (012) 312-5911; Fax (012) 321-6770

(Published in the Government Gazette 2 September 2004; No 26762)

### **Managing ICTs in South African Schools – A Guide for School Principals**

Maryla Bialobrzaska and Susan Cohen, South Africa Institute for Distance Education, 2005

Downloadable free from <http://www.saide.org.za/frontend/> and

Obtainable on CD-ROM from Edumedia, 3 Station Road, Mowbray, or

[http://edumedia.wcape.school.za/catalog/welcome\\_s.html](http://edumedia.wcape.school.za/catalog/welcome_s.html) at R25 plus postage.