PRIMARY SCHOOL CURRICULUM

The uses made of computers in WA Primary Schools follow the guidelines set forth in the publication "Computer Use in Primary Education Policy" developed by the Ministry of Education. This document is written in the form of goals and outcomes, with these leading into a continuum of specific achievements. This approach allows flexibility in the way computers are implemented by different schools on different platforms, while the outcomes should be comparable.

There are goals for teachers and for students:

1. for all primary school teachers to be in a position to make decisions about the potential of computers to achieve their teaching objectives and enhance the learning of their students by:
   - incorporating the regular use of the computer in their own teaching/learning environment as a tool to achieve particular objectives;
   - using their knowledge about good teaching practice to identify potential software and to evaluate its usefulness in achieving their educational objectives;
   - using a computer as a personal tool.

2. for all primary students to:
   - become confident about using the computer as a learning tool;
   - use a computer regularly across the curriculum to achieve learning objectives and to solve problems in the context of their daily classroom activities.

The continuum along which schools should progress starts with schools using computers very little, perhaps for drill and practice but not as a tool for meeting educational objectives or for problem solving, and the teachers themselves are reluctant to integrate the technology into their subject areas or classrooms due to lack of knowledge on their part.

From here schools progress using available resources, professional development of staff, inserviceing and so on to be able to address areas where technology can be used. Staff are encouraged to look at software and integrate this into part of their teaching program. This could be selecting a piece of software and taking that as the theme for a term's work bringing in the Maths, Science, Social Science and English curricula around this theme. Teachers are also encouraged to use the computers for their own work, letters to parents, writing lesson plans, keeping track of student assessment and so on. This has the dual purpose of making teachers more comfortable with the equipment, but also students see that teachers find them a valuable tool.

Students are encouraged to use the computers with guidance from their teachers both individually and in group situations. With help students should begin to appreciate when certain types of software are more suitable for a given situation, eg. graphics package, word processor or desktop publishing.

As the school progresses, teachers will use computers for all their administrative tasks being able to retrieve letters and reports previously written and modify them. Teachers should now be able to review and appraise software and integrate a variety of packages into many of their teaching areas. Students should also be free to use technology to solve problems where they see it can be of use. Rather than teacher directed use it should become student directed. Most work will be word processed, and students should know what applications to use when collecting, retrieving, organizing and analysing data.

Computers should be used across the curriculum to produce solutions in a variety of subject areas. For example:

- Mathematics - using specific maths programs, or doing investigations with more general packages such as LOGO, Spreadsheets etc;
- English - using word processors, Desktop Publishing, Creative story writing programs etc;
- Social Studies - using databases, CD ROM Encyclopedias, word processors, simulation packages etc;
- Science - specific science investigation packages, but many integrated software packages to analyse data, create graphs etc;
- Art - using different drawing and painting packages, animation etc, and so the list can go on.

The Primary policy is aimed at giving guidelines to schools and teachers on the directions to follow when using computers in Primary schools, but leaves the actual implementation of the schools policy up to individual schools so they can progress at their rate using whatever hardware and software they select.

SECONDARY SCHOOL CURRICULUM

During the first three years of High School students can take up to four courses (units) in Information Technology. The first three of these
units are designed to be taken consecutively with the skills in the earlier units being the basis for work in the later ones. All four units are written in terms of objectives and outcomes, rather than a step by step curriculum laid out for teachers to follow. The units are not aimed at learning about computers for their sake, but how we all use computers in our daily lives and how they impact all of society.

Examples of the objectives from the second unit (Information Processing 8131) are:

- students become more discerning users of software;
- students will appreciate the diverse and far reaching uses of computers and associated technology in industry and society as a whole;
- students will discuss certain types of information classification and investigate some of the ways in which information can be disseminated;
- students will be aware of a number of moral and ethical issues concerning the use of information in information technology industries;
- students will understand that information processing is a system of operations and procedures that involves the integration of information, hardware and people;
- students will investigate the changing nature of information and its effects on Australian society;
- students will adopt correct work postures and practices in relation to set tasks and carefully consider ergonomic requirements.

This approach to the IT curriculum in lower school means teachers have a lot of flexibility in their interpretation of the courses. For the experienced teacher this is an enjoyable challenge but for the inexperienced it can create quite a problem.

To achieve these objectives and outcomes it is presumed certain things will be covered as part of each unit as follows:

The first unit, Computer Literacy 8111, introduces students to basic hardware and software used in computer systems, a little history of computing, rudimentary use of application packages and some simple programming. The aim of this beginning course is to introduce computers and their varied uses to students so that, should this be the only IT course taken by a student, they will know the main hardware components found in systems, have some familiarity with the more common application packages and have some understanding of the impact computers have on society. This course provides a good basis for further study in IT and is usually followed by the first Information Processing unit.

The next unit is Information Processing 8131 where students are exposed to the application packages most commonly used today and how they can be used in a variety of situations. As can be seen from the above objectives the aim of this unit is not to produce students who are good at word processing, databases or spreadsheets, but rather students who can appreciate the use of computers in a variety of areas, and the implications for themselves and society of this ever increasing use of technology. To develop this understanding students do use different packages to achieve a certain end (e.g., a milk vendor can keep track of his customers' orders, and produce invoices and credit payments) and therefore learn about databases and spreadsheets as the means to this end, rather than as an end in itself.

Following from Information Processing 8131 is Information Processing 8151 which takes the use of packages further and encourages students to develop an information system of their own using all the hardware and software available to them. An approach to this course is to follow one theme through (e.g., running a small club, or business) using word processors, databases, spreadsheets, graphics packages and CAD packages to handle all the requirements of the organization. This way students can appreciate how a variety of software can be used to improve the productivity of any organization.

Languages used for this course can vary, with the two most common being LOGO and Pascal. As the course progresses the students will become familiar with the use of different control structures, writing individual procedures, passing parameters, declaring local and global variables, and so on.

As all four units are based on objectives and outcomes rather than a prescribed syllabus, the implementation of these units is very much up to the interpretation of the teacher. This flexibility allows students to progress at varying rates depending on abilities and interest, and assessment is based on the level of achievement of certain objectives, not on any pre-defined knowledge base.

As with many States, though these courses are taught in the Government Schools, it is not necessary for Independent Schools to follow them. Therefore, there are a wide range of lower secondary courses taken in the Independent Schools. These tend to loosely follow the Unit Curriculum but do allow a much greater freedom for the teacher to pursue their interests or the interests of the students. Describing these courses would be impossible as they vary from school to school.

In the upper secondary sector both the Government and Independent systems follow the syllabus laid down by the Secondary Education Authority. The Upper Secondary courses fall into two categories - Tertiary Entrance Scoring (TES) subjects and non Tertiary Entrance Scoring (non TES) subjects. In Years 11 and 12 students can study Applied Computing (non - TES) or Computing (TES). The courses for Year 11 and 12 are supposed to be two single year courses, though the syllabus for Computing does require knowledge of the Year 11 course.

Over two years the Applied Computing course aims to provide students with:

- a broad understanding of the operation of computers;
- skills in the main applications of computers;
- experience with the collection, manipulation and presentation of information.

The objectives of the course are that students:

- proficiently use the more
sophisticated functions of a word processing, spreadsheet and database management package;
• design, create and use a simple database using a database management package;
• proficiently use the main functions of at least one personal productivity tool other than word processing, spreadsheet or data management (eg graphics, CAD, music synthesis etc);
• discuss various considerations associated with a topic studied as an elective topic (robotics, artificial intelligence, social implications of computers etc) or proficiently use the main functions of another package covered as an elective topic (eg. CAD, graphics packages, programming, CAI software, simulation packages etc);
• use terminology associated with computer systems - hardware, software and personnel;
• use terminology associated with computer communications systems;
• discuss various aspects of computer networks;
• use some of the online systems commonly available.

Students taking Applied Computing learn the skills necessary to make them an intelligent consumers of computer hardware and software. It is not designed to help students going on to study computing at tertiary level, but to help students regardless of what they do after school - whether study in a variety areas where knowledge of word processing, spreadsheets, database management, graphics, communications etc is very helpful, or whether they are entering the workforce where computer skills are always needed.

Assessment of the Applied Computing course is totally internal with consensus meetings, and visits by moderators to selected schools used to ensure comparability between schools.

Over two years the Computing course aims to provide students with:
• a conceptual basis for more advanced studies in either computer applications, information systems or computer science;
• an understanding of selected aspects of computer and information processing technology;
• an understanding of the impact of the computer and information processing technology on individuals and organisations within our society and society itself;
• assistance in the development of problem-solving skills related to the use of computers;
• skills developed in the design and implementation of computer systems;
• an awareness of the opportunities which exist in information technology industries.

By the end of the course, the student should:
• be able to collect and process data using a computer system;
• be able to express solutions to information related problems in a variety of forms;
• demonstrate an understanding of the processes involved in designing and implementing computerised information processing systems;
• be able to demonstrate a knowledge of the advantages and disadvantages of information processing using a computer;
• have some awareness of the social and organisational consequences of information systems and technology and of the ethical standards required of its practitioners;
• show some knowledge of the many and varied applications of the computer;
• demonstrate a working knowledge of the vocabulary associated with computers and computing technology.

The courses for both years are divided into three sections - Algorithms (45%), Technology (25%) and Systems (30%). The Algorithms are converted to Standard Pascal for implementation on a computer, while the Systems section requires, particularly in Year 11, knowledge of one or more Personal Productivity tools so that simple systems can be implemented. The balance of the course is theoretical.

The Year 11 computing course covers:
Systems:
Computer based systems: their strengths and limitations, batch and on line systems, information presentation, reporting and querying, data security, systems analysis and design looking at the Life Cycle approach and Design Notations (data flow diagrams etc).