Introduction

1.1 Introduction to this resource

The Ready for Work Plan: School to Work Program

The NSW Government’s Ready For Work Plan details a commitment to improving the preparation of school leavers moving into the workforce and/or further education and training by providing them with:

• relevant vocational skills
• up to date workplace knowledge
• advice on a broad range of training options.

The School to Work Program focuses on:

• introducing individual school to work plans through students recording their employment related skills, developing action plans and tracking their career planning progress using the Employment Related Skills Logbook over a period of up to four years
• expanding student access to work education programs
• improving workplace learning opportunities
• developing and disseminating industry-specific information on vocational pathways
• providing training and development for careers advisers and other teachers.

This resource provides teachers with information and teaching strategies to support the implementation and use of the School to Work Planning Employment Related Skills Logbook.

The School to Work Planning Employment Related Skills Logbook

This logbook enables students to record their transition planning over a period of up to four years and to articulate how their vocational learning experiences at school and beyond have prepared them for life long learning.
Why use the logbook?

Research from major employment agencies, multi-national companies and professional employer groups has found that employers are specifically seeking indicators from the key competencies and other employment related skills.

The changing nature of work has resulted in a changing work environment. The main features emerging are moves from:

- continuous employment to continued employability
- vertical careers to lateral careers
- a single career to multiple careers within a working lifetime
- employer managed careers to employee managed careers.

Students are already learning and developing these employment related skills daily in the classroom but have not been able to track and articulate them to their full potential. Pages from the logbook’s classroom section can be used to brainstorm, summarise and reflect all the knowledge and skills gained during any lesson, topic, activity or unit of work. Teachers can use the classroom section of the logbook to demonstrate how their subject or course offers students valuable knowledge plus the employment related skills students will need for future life, education, training and employment.

The logbook is also a useful tool for schools to use when writing school leaver references.

1.2 Mathematics curriculum: Vocational links

Pedagogy

Effective teaching and learning will be achieved by Mathematics teachers who use pedagogy which promotes intellectual quality and provides access to learning environments to link student learning to personal, social and work contexts outside of the classroom. Effective delivery of vocational learning will incorporate relevant Mathematics syllabus outcomes, embed the Work, Employment and Enterprise and Key Competencies cross-curriculum content statements and be based on a range of pedagogical approaches which draw on and promote students’ understanding of the world beyond the immediate school context.
Board of Studies K-10 curriculum framework review

The School to Work Planning Employment Related Skills Logbook reflects the key directions of the Board of Studies in its review of the K-10 curriculum framework. In this framework the Board of Studies has incorporated Work, Employment and Enterprise and the Key Competencies into its cross-curriculum content statements. The logbook is a tool that supports the implementation of this content into any Mathematics program.

Stage 6 syllabus links to vocational learning

Use of the logbook supports the following Board of Studies Stage 6 syllabus content statements under the heading ‘Post-School Opportunities’:

The General Mathematics course provides students with knowledge, skills, understanding and attitudes that form a valuable foundation for further education and training, employment and full and active participation as citizens. Increasingly, mathematics underlies the framework to the vast areas of technology, business, the environment and the physical, biological and social sciences.

The General Mathematics course also provides a strong foundation for vocational pathways, either in the workforce or in further vocational training studies, and for university courses in the areas of business, the humanities, nursing and paramedical sciences.

The Mathematics course provides students with an understanding and competence in mathematics applicable to the real world. It is a basis for further studies in mathematics at tertiary level in support of courses including life sciences and commerce.

The Mathematics Extension 1 course provides students with a thorough understanding of, and competence in, mathematical techniques and applications relevant to solving real world problems. This course forms the basis for further studies at tertiary level in mathematics, the physical sciences, engineering sciences and the technological sciences.

The Mathematics Extension 2 course provides students with an understanding of mathematical ideas and techniques that can be applied to a variety of practical problems. It provides the mathematical background necessary for further studies in mathematics at tertiary level and for courses including science, economics and engineering.

Recognition of student achievement in Vocational Education and Training (VET)

All Stage 6 Mathematics syllabuses state wherever appropriate, the skills and knowledge acquired by students in their study of HSC courses should be recognised by industry and training organisations. Recognition of student achievement means that students who have satisfactorily completed HSC courses will not be required to repeat their learning in courses in TAFE NSW or other Registered Training Organisations (RTOs).
Stage 5 syllabus links to vocational learning

Use of the logbook supports the following Stage 5 objectives and outcomes from the NSW Board of Studies syllabuses:

- Mathematics Years 9-10, Advanced Course 1996
- Mathematics Years 9-10, Intermediate Course 1996
- Mathematics Years 9-10, Standard Course 1996

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Values and attitudes | • demonstrates a positive response to the use of Mathematics as a tool in practical situations
• shows a willingness to work co-operatively with others and to value the contributions of others
• shows an interest in and enjoyment of the pursuit of mathematical knowledge
• shows a willingness to take risks when working mathematically
• shows a willingness to persist when solving problems and to try different methods
• uses Mathematics creatively in expressing new ideas and discoveries
• realises that justification of intuitive insights is important
• appreciates how Mathematics is used in a range of aspects of society
• appreciates the contribution of Mathematics to our society
• appreciates the impact of mathematical information on daily life |
| Appreciation of mathematics as an essential and relevant part of life | |

“All Australians must leave school well prepared to meet the demands of their future lives and with the knowledge and attitudes needed to become lifelong learners of mathematics”.

A National Statement on Mathematics for Australian Schools Curriculum Corporation for AEC 1990
Related processes

Use of the logbook supports the following processes essential in the teaching of Mathematics Stage 5 in the Advanced, Intermediate and General Courses:

- communication
- creative process
- observation
- representation
- investigation
- comparison
- relationships
- abstraction
- generalisation
- calculation
- measurement
- estimation
- innovation
- problem-solving
- decision-making
- analysing
- reasoning
- connecting ideas
- motivation
- reflection
- writing
- drawing diagrams
- listening
- discussion
- graphical techniques
- algebraic interpretation
- justification
- competence
- organisation
1.3 Questionnaire for teachers

Are you already teaching employment related skills in the classroom to Stage 5 students?

Students gain a variety of employment related skills in every subject. Complete this questionnaire to determine the extent to which you are already teaching employment related skills to your students.

<table>
<thead>
<tr>
<th>Do Year 9 and 10 students develop any of these skills in your classroom?</th>
<th>Tick and add to the list below.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication skills</strong></td>
<td><strong>Social skills</strong></td>
</tr>
<tr>
<td>(Tick) <em>Are you teaching students to</em></td>
<td>(Tick) <em>Are you teaching students to</em></td>
</tr>
<tr>
<td>... speak to a group confidently</td>
<td>... listen when others speak</td>
</tr>
<tr>
<td>... debate in front of a large audience</td>
<td>... respect the point of view of others</td>
</tr>
<tr>
<td>... speak and write another language</td>
<td>...</td>
</tr>
<tr>
<td>... work with other people to sort out a problem</td>
<td>...</td>
</tr>
<tr>
<td>... follow verbal instruction</td>
<td>...</td>
</tr>
<tr>
<td>... convey ideas confidently</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>Numerical skills</strong></td>
<td><strong>Physical skills</strong></td>
</tr>
<tr>
<td>(Tick) <em>Are you teaching students to</em></td>
<td>(Tick) <em>Are you teaching students to</em></td>
</tr>
<tr>
<td>... record information using charts and graphs</td>
<td>... swim .......... metres</td>
</tr>
<tr>
<td>... calculate percentages</td>
<td>... referee a game of ........</td>
</tr>
<tr>
<td>... work out and manage a budget</td>
<td>... understand rules to the following sports:</td>
</tr>
<tr>
<td>... handle money and give the right change</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>ICT skills</strong></td>
<td><strong>Creative skills</strong></td>
</tr>
<tr>
<td>(Tick) <em>Are you teaching students to</em></td>
<td>(Tick) <em>Are you teaching students to</em></td>
</tr>
<tr>
<td>... use a word processor</td>
<td>... design and construct several small pieces of furniture</td>
</tr>
<tr>
<td>... send an email</td>
<td>... write and perform a short play</td>
</tr>
<tr>
<td>... use a fax machine</td>
<td>... design and produce several artworks using pastels and oils</td>
</tr>
<tr>
<td>... use the following software programs:</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td><strong>Leadership skills</strong></td>
<td><strong>Practical skills</strong></td>
</tr>
<tr>
<td>(Tick) <em>Are you teaching students to</em></td>
<td>(Tick) <em>Are you teaching students to</em></td>
</tr>
<tr>
<td>... captain a sporting team</td>
<td>... investigate a problem</td>
</tr>
<tr>
<td>... participate in the SRC</td>
<td>... follow occupational health and safety rules</td>
</tr>
<tr>
<td>...</td>
<td>... work well in a team</td>
</tr>
<tr>
<td>...</td>
<td>... meet deadlines</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Are you already teaching employment related skills in the classroom to Stage 6 students?

Students gain a variety of employment related skills in every senior course they study. Complete this questionnaire to determine whether you are already teaching these employment related skills to your students.

<table>
<thead>
<tr>
<th>Do Year 11 and 12 students develop any of these skills in your classroom?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick and/or add to the list below.</td>
</tr>
</tbody>
</table>

As a result of my lessons a student may develop the ability to:

(Tick)

- Communicate ideas and information
- Collect, organise andanalyse information
- Generate, identify and assess opportunities
- Identify, assess and manage risks
- Generate and use creative ideas and processes
- Solve problems
- Recruit and manage resources
- Match personal goals and capacities to undertakings
- Work with others and in teams
- Be flexible and deal with change
- Use initiative and drive
- Negotiate and influence
- Plan and organise

The logbook provides you with a tool to summarise a topic and to explain to students how and when they develop these employment related skills.
Employment related skills in the classroom

The classroom section of the Employment Related Skills Logbook has been designed to enhance the value and relevance of all subjects and courses students study at school. Sheets in this section provide teachers with a topic summary tool.

2.1 Sample pages from the logbook

Sample pages from the classroom section of the Employment Related Skills Logbook are shown on the following two pages. These sheets can be used to brainstorm and reflect all the knowledge and skills gained or developed at the end of a topic. Teachers are provided with an opportunity to demonstrate to students how their subject allows students to develop the skills they will need for future life, education, training and employment.

2.2 Models for recording employment related skills in the classroom

Below are three different models for teachers to consider when developing their own system of recording employment related skills in the classroom.

<table>
<thead>
<tr>
<th>Model 1: Student managed</th>
<th>Model 2: Teacher managed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. End of topic - student brings logbook.</td>
<td>1. Teacher keeps blank logbook sheets in classroom.</td>
</tr>
<tr>
<td>2. Class brainstorm topic.</td>
<td>2. End of topic - class brainstorms topic.</td>
</tr>
<tr>
<td>3. Students identify and summarise knowledge gained and skills developed.</td>
<td>3. Students identify and summarise knowledge gained and skills developed.</td>
</tr>
<tr>
<td>4. Students record employment related skills on sheets.</td>
<td>4. Teacher distributes blank logbook sheets.</td>
</tr>
<tr>
<td>5. Teacher initials sheets.</td>
<td>5. Students record employment related skills on sheets.</td>
</tr>
<tr>
<td>6. Students file sheets into logbook and take home.</td>
<td>6. Teacher collects sheets.</td>
</tr>
<tr>
<td>7. Teacher initials sheets.</td>
<td>7. Teacher initials sheets.</td>
</tr>
<tr>
<td>8. Teacher gives sheets to clerical aide or nominated students to file.</td>
<td>8. Teacher gives sheets to clerical aide or nominated students to file.</td>
</tr>
</tbody>
</table>

Model 3: School managed - (school reports)

1. School adds heading ‘Employment related skills’ to half yearly and yearly reports.
2. Faculties decide which employment related skills are most relevant to list on reports.
3. Teachers tick students’ level of achievement/development observed in classroom (twice a year).
4. Teachers encourage students to log employment related skills in their logbooks.
5. Students log employment related skills gained in all subjects/courses.

Alternatively, teachers may develop their own model for implementing the CLASSROOM section of the logbook.
**SUBJECT:**

**YEAR 9 and YEAR 10 SKILLS IN THE CLASSROOM**

You gain a range of important skills in this subject. Research some of the careers and/or TAFE and university courses related to these skills.

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Teacher initial</td>
</tr>
</tbody>
</table>

What employment related skills have you acquired in this subject?

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Teacher initial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Teacher initial</td>
</tr>
</tbody>
</table>
COURSE:

PRELIMINARY AND HSC COURSES - SKILLS IN THE CLASSROOM

You gain a range of important skills in this course. Research some of the careers and/or TAFE and university courses related to these skills.

What employment related skills have you acquired in this course?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date  
Teacher initial

<table>
<thead>
<tr>
<th>Date</th>
<th>Teacher initial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date  
Teacher initial

<table>
<thead>
<tr>
<th>Date</th>
<th>Teacher initial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 Examples of employment related skills developed in Mathematics Stage 5

Students gain a variety of employment related skills in every subject they study. Here are some examples of employment related skills developed by students studying Stage 5 Mathematics subjects.

**Communication skills**
- Share ideas with others
- Present a solution for a problem to a group
- Communicate mathematical knowledge clearly and logically
- Report on a mathematical investigation or experiment

**Practical skills**
- Select and use appropriate mathematical techniques
- Interpret diagrams, symbols and texts
- Solve problems
- Estimate the results of calculations
- Check the reasonableness of results
- Draw graphs and diagrams to represent information

**ICT skills**
- Source information using the Internet
- Use appropriate technology to assist in the solution of problems
- Design and create databases
- Analyse data using a spreadsheet
- Import graphics and images into a multimedia presentation
- Use software to model mathematical problems

**Social skills**
- Actively listen while others speak
- Work co-operatively in a group
- Have respect in dealings with others
- Participate actively in class discussions
Creative skills

- Interpret the results of problem solving in different contexts
- Use a range of media to present ideas and information to others
- Develop a range of strategies to deal with unfamiliar situations
- Use creative processes to solve unfamiliar problems

Leadership skills

- Lead group activities
- Display sensitivity for the feelings of others in group situations
- Negotiate with other people

Numerical skills

- Construct graphs and tables
- Interpret information contained in a table or graph
- Carry out algebraic and arithmetic calculations
- Perform basic operations without the use of a calculator
- Use technology to solve problems
2.4 Examples of employment related skills developed in Mathematics Stage 6

Students gain a variety of employment related skills in every course they study. Here are some examples of employment related skills developed in students studying Stage 6 Mathematics courses.

Communicate ideas and information
- Use graphs to represent data
- Use diagrams to represent information
- Explain the solution to a mathematical problem
- Verbalise the reasoning used in arriving at a solution to a problem

Collect, organise and analyse information
- Use deductive processes to develop and construct a proof to a geometry problem
- Collect, organise and analyse the results of a statistical experiment
- Collect, organise and analyse information presented in a worded mathematical problem

Identify, assess and manage risks
- Willingly take risks when working mathematically

Generate and use creative ideas and processes
- Investigate alternative methods and techniques to solve a mathematical problem
- Use creative processes to solve problems in the Mathematics Competition
- Explore the applications of mathematics in the real world

Solve problems
- Use a variety of problem-solving methods to solve mathematical problems in different contexts
- Solve mathematical problems in the context of the real world
- Write the proof for geometrical problems

Recruit and manage resources
- Use mathematical skills to manage a budget
- Use technology to identify and collect problem solving software

Work with others and in teams
- Work in a team to solve a variety of mathematical and geometrical problems

Plan and organise
- Organise the steps used to solve a problem into a logical sequence
- Plan the solution to a mathematical problem by selecting the most appropriate problem solving technique
- Organise and plan meetings for the Year 12 farewell budget committee
2.5 Teacher Activities: Employment related skills in the classroom

Standard Mathematics Stage 5

The following examples show some of the employment related skills developed by students as a result of their participation in activities or topics in Standard Mathematics Stage 5. Using the examples as a guide, develop your own list of employment related skills that students may gain by undertaking activities or curriculum topics in your classroom.

Examples

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics in the workplace</td>
<td>Students can .../Students are able to .../Students know how to ...</td>
</tr>
<tr>
<td></td>
<td>• calculate earnings including wages, salary, commission</td>
</tr>
<tr>
<td></td>
<td>• read and interpret tables relating to income</td>
</tr>
<tr>
<td></td>
<td>• prepare a budget for a given income</td>
</tr>
<tr>
<td></td>
<td>• graph data on careers</td>
</tr>
<tr>
<td></td>
<td>• interpret and make comparisons on data represented in graphs</td>
</tr>
<tr>
<td></td>
<td>• choose a job from the positions vacant and plan their application</td>
</tr>
<tr>
<td></td>
<td>• mentally perform simple mathematical calculations</td>
</tr>
<tr>
<td></td>
<td>• use a calculator efficiently</td>
</tr>
<tr>
<td></td>
<td>• organise a fundraising activity to experience real “profit and loss”</td>
</tr>
</tbody>
</table>

Date:  
Teacher initial:

<table>
<thead>
<tr>
<th>Chance</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• define an experiment to investigate chance</td>
</tr>
<tr>
<td></td>
<td>• describe events which have a probability of ½, 0, 1</td>
</tr>
<tr>
<td></td>
<td>• prepare an organised list of possible events for an experiment</td>
</tr>
<tr>
<td></td>
<td>• graph the results of a probability experiment</td>
</tr>
</tbody>
</table>

Date:  
Teacher initial:
## Intermediate and Advanced Mathematics Stage 5

The following examples show some of the employment related skills developed by students as a result of their participation in activities or topics in Advanced Mathematics Stage 5. Using the examples as a guide, develop your own list of employment related skills that students may gain by undertaking activities or curriculum topics in your classroom.

### Examples

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumer Arithmetic</strong></td>
<td></td>
</tr>
</tbody>
</table>
• calculate gross and net salaries  
• use a calculator  
• organise information into a budget  
• use percentages to solve interest problems  
• interpret a tax table |

**Date:** Teacher initial:  

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Co-ordinate Geometry</strong></td>
<td></td>
</tr>
</tbody>
</table>
• represent information using graphs and tables  
• make decisions on the appropriateness of an answer  
• express an answer in algebraic form  
• analyse and apply properties of geometric shapes  
• justify the proof to a problem |

**Date:** Teacher initial:  

### Your example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
</table>

**Date:** Teacher initial:
General Mathematics Stage 6

The following example shows some employment related skills developed by students as a result of their participation in activities or topics in General Mathematics Stage 6. Using the example as a guide, develop your own list of employment related skills that students may gain by undertaking activities or curriculum topics in your classroom.

Example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collection and sampling</td>
<td>• organise and represent collected data</td>
</tr>
<tr>
<td></td>
<td>• justify a response to a given problem using mathematical terminology</td>
</tr>
<tr>
<td></td>
<td>• distinguish between different types of data</td>
</tr>
<tr>
<td></td>
<td>• determine the most appropriate method to solve a given problem</td>
</tr>
<tr>
<td></td>
<td>• prepare and present oral and written reports</td>
</tr>
<tr>
<td></td>
<td>• discuss the reasonableness of drawing conclusions from the data collected</td>
</tr>
<tr>
<td></td>
<td>• represent information in symbolic, graphical and tabular form</td>
</tr>
</tbody>
</table>

Date: Teacher initial:

Your example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students can .../Students are able to .../Students know how to ...</td>
</tr>
</tbody>
</table>

Date: Teacher initial:
### Mathematics and Mathematics Extension 1 Stage 6

The following example shows some employment related skills developed by students as a result of their participation in activities or topics in Mathematics and Mathematics Extension 1 Stage 6. Using the example as a guide, develop your own list of employment related skills that students may gain by undertaking activities or curriculum topics in your classroom.

#### Example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of calculus to the physical world</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- communicate information in graphical form</td>
</tr>
<tr>
<td></td>
<td>- analyse information in problems relating to real world situations</td>
</tr>
<tr>
<td></td>
<td>- organise information into a logical sequence of events</td>
</tr>
<tr>
<td></td>
<td>- use appropriate mathematical formulae and techniques to solve the problem in context</td>
</tr>
<tr>
<td></td>
<td>- use creative processes to match mathematical concepts with real life problems</td>
</tr>
</tbody>
</table>

Date: Teacher initial:

#### Your example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can ...</td>
<td>Students are able to ...</td>
</tr>
</tbody>
</table>

Date: Teacher initial:
Mathematics Extension 2 Stage 6

The following example shows some employment related skills developed by students as a result of their participation in activities or topics in Mathematics Extension 2 Stage 6. Using the example as a guide, develop your own list of employment related skills that students may gain by undertaking activities or curriculum topics in your classroom.

Example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can ...</td>
<td>Students are able to ...</td>
</tr>
<tr>
<td>Mechanics</td>
<td>• derive an equation from given data</td>
</tr>
<tr>
<td></td>
<td>• apply appropriate mathematical formulae to solve motion problems</td>
</tr>
<tr>
<td></td>
<td>• describe in mathematical terms the physical path of an object</td>
</tr>
<tr>
<td></td>
<td>• analyse graphical information</td>
</tr>
<tr>
<td></td>
<td>• assess the appropriate formulae needed to solve real world problems</td>
</tr>
</tbody>
</table>

Date: Teacher initial

Your example

<table>
<thead>
<tr>
<th>Activity/Topic</th>
<th>Employment Related Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can ...</td>
<td>Students are able to ...</td>
</tr>
</tbody>
</table>

Date: Teacher initial
Mathematics and vocational learning

This section contains vocational information and activities for teachers and students of Mathematics.

3.1 Enterprise education

Enterprise education is action learning. It involves students, usually in teams with creating and sustaining a project which may be voluntary or profit making. It develops students’ personal and employment related attributes including the ability to be innovative and to successfully manage change. It provides opportunities for young people to develop these attributes in workplace and community settings.

Examples of enterprise education in Mathematics could include students:

- planning, organising and running events such as sports carnivals
- operating a school based business involving calculations, weights and measures, volumes and costs, for example, uniform shop, hydroponic vegetables
- organising and running a regular mathematics competition
- conducting and publishing surveys of student habits and preferences
- undertaking the Young Achievement Australia program Business Enterprise, where student teams form companies to market goods and services related to calculations and other areas of Mathematics
- implementing a volunteer project working with primary school students on numeracy
- organising the food ordering for the school canteen.

What examples of enterprise education take place in Mathematics in your school?

- .............
- .............
3.2 Teachers in Business program

The Teachers in Business (TIB) program is designed to improve teaching practice and enhance teacher awareness of business and industry. Students benefit from enhanced vocational perspectives in their learning.

All teachers K–12 are eligible to apply for this program. No portion of the placement has to involve non-teaching time. Teachers are supported with relief and other expenses to work in businesses and other organisations for up to three weeks.

Priority is given to teachers updating their industry currency for VET courses and for teachers who have clearly outlined how the placement will enhance their teaching. Applications are processed by the school’s District Office. Contact your District Vocational Education Consultant for details.

3.3 Community and business partnerships

Partnerships between schools and industry, commerce and the local community are encouraged as a means of increasing vocational learning opportunities and enhancing school to work transition planning for students.

Examples of partnerships include: Links to Learning Program, Jobs Pathways Program, E-Teams, guest speaker programs, organisations regularly hosting excursions, work experience and work placement, practice firms and other enterprise programs. Your school will also have its own examples of existing partnerships.

3.4 Traineeships and apprenticeships

Traineeships and apprenticeships are jobs that combine work with training.

Apprenticeships generally last four years and cover traditional trade areas including aircraft, automotive, boat building, bricklaying, cookery, drafting, electrical, electronic, floor covering, greenkeeping, hairdressing, plumbing, saddlery, sign writing, stone masonry and woodmachining.

More than 600 traineeship vocations have been introduced to provide employment and training opportunities in a broader range of industry areas. Some examples are:


Automotive — Automotive Manufacturing, Heavy Vehicle Brakes, Mechanical - Air Conditioning, Vehicle Body - Detailing, Outdoor Power Equipment (Services)

Building and Construction — Bridge/Marine Construction, Tunnel Construction, Railway Construction & Maintenance

Manufacturing Engineering — Aircraft Maintenance Engineering - Avionics, Engineering Production Technology
3.5 Part-time traineeships in NSW schools

School based traineeships provide students with increased opportunities to gain experience and qualifications in a particular industry while still at school. Students are able to include a recognised VET qualification within their HSC and combine this with paid work.

Students successfully completing a school based traineeship receive:

- a nationally recognised VET qualification under the Australian Qualifications Framework
- a Certificate of Proficiency
- credit toward the Higher School Certificate.

Generally, over the two years of their school based part-time traineeship, students spend the equivalent of three and a half days a week on their HSC program at school, one day a week in paid employment with their employer and a half day a week undertaking structured training either at school, TAFE or another registered training organisation.

3.6 Credit transfer arrangements: HSC to TAFE NSW

Credit transfer is a form of recognition based on formal arrangements between educational institutions.

Credit transfer arrangements negotiated between the NSW Board of Studies and TAFE NSW allow students credit for study completed as part of the HSC.

To be eligible for credit transfer in a TAFE NSW course, students need to provide appropriate evidence of previous study or experiences at the time of enrolment. Credit is awarded depending on whether study and experience is relevant to a student’s chosen TAFE NSW course.

Successful students will receive advanced standing into their chosen TAFE NSW course and complete fewer modules making it possible to achieve a TAFE NSW qualification faster.
Students who successfully complete the **General Mathematics HSC** and meet the conditions for credit, would be eligible to receive credit for specified modules in TAFE NSW courses such as:

- Access to Work and Educational Opportunities
- Career Education and Employment for Women (CEEW)
- Computer/Electronics VET for Schools
- Detail Drafting
- Electrical Engineering
- Electrical Technology
- Electrical Trade VET for Schools
- Electrotechnology Communications
- Electrotechnology Computer Systems
- Electrotechnology Entertainment and Servicing
- Engineering
- Foundation and Vocational Education
- General and Vocational Education (CGVE)
- HVAC - Refrigeration Engineering
- Manufacturing Systems
- Manufacturing Technology
- Materials Technology
- Mechanical Engineering
- Mechanical Technology
- Mechatronics
- Naval Architecture
- Photonics
- Quality Systems
- Refrigeration Trade VET for Schools
- Telecommunications
- Work Skills

Students who successfully complete the **Mathematics Extension 1 HSC** course and meet the conditions for credit, would be eligible to receive credit for specified modules in TAFE NSW courses such as:

- Computer/Electronics VET for Schools
- Detail Drafting
- Electrical Engineering
- Electrical Technology
- Electrical Trade VET for Schools
- Engineering
- HVAC - Refrigeration Engineering
- Manufacturing Systems
- Manufacturing Technology
- Materials Technology
- Mechanical Engineering
- Mechanical Technology
- Mechatronics
- Naval Architecture
- Photonics
- Quality Systems
- Refrigeration Trade VET for Schools
- Telecommunications
Students who successfully complete the *Mathematics HSC* course and meet the conditions for credit, would be eligible to receive credit for specified modules in TAFE NSW courses. Some of the courses listed have a minimum level of achievement in Mathematics for entry. Make sure you check the course requirements.

- Access to Work and Educational Opportunities
- Applied Science (Environmental Technology)
- Automotive Sales
- Automotive Services
- Career Education and Employment for Women (CEEW)
- Electronics VET for Schools
- Detail Drafting
- Electrical Engineering
- Electrical Technology
- Electrical Trade VET for Schools
- Electrotechnology
- Engineering
- Foundation and Vocational Education
- HVAC - Refrigeration Engineering
- Hospitality
- Information Technology
- Local Government Foundation Studies
- Manufacturing Systems
- Materials Technology
- Mechanical Engineering
- Mechanical Technology
- Mechatronics
- Natural Resource Management
- Naval Architecture
- Nutrition and Dietary Practices
- Photonics
- Quality Systems
- Refrigeration Trade VET for Schools
- Small Business Management
- Telecommunications
- Work Skills
- Firefighting Operations
- Coal Operational Management
- Fire Technology
- Civil Engineering
- Construction Management
- Geographic Information Systems
- Hydrology and Environmental Management
- Land and Engineering Survey Drafting
- Spatial Information Services
- Structural Engineering
- Surveying

Further information about credit transfer for HSC courses can be found at:
http://www.det.nsw.edu.au/hstafe

# Note: VET ICFs are based on units of competency not modules. Credit Transfer for students who study VET ICFs need to speak with TAFE NSW enrolling officers for information about the amount of module credit available.
3.7 Credit transfer arrangements: TAFE NSW to university

On completion of any TAFE NSW diploma or advanced diploma students are eligible to apply to any university in Australia. A student may be entitled to receive credit for subjects in a university degree course.

Universities have different entry requirements for each course. Entry requirements can vary between universities and between courses. They consider applications for credit on a case by case basis.

Listed below are some examples of credit arrangements. They are a guide only to help teachers and students understand pathway planning options.

<table>
<thead>
<tr>
<th>TAFE NSW - Sydney Institute Course</th>
<th>University</th>
<th>Degree Course</th>
<th>Credit Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>9434 Advanced Diploma of Accounting</td>
<td>Australian Catholic</td>
<td>Bachelor of Business (Accounting)</td>
<td>Up to 80 credit points (one year) if awarded at the Credit grade, though not all credit can be given in the same year.</td>
</tr>
<tr>
<td></td>
<td>Macquarie</td>
<td>Bachelor of Commerce - Accounting</td>
<td>36 credit points granted out of 68 required for completion of the degree</td>
</tr>
<tr>
<td></td>
<td>Newcastle</td>
<td>Bachelor of Commerce Bachelor of Economics Bachelor of Finance Bachelor of Business</td>
<td>Credit for up to 80 credit points or equivalent to one full year, though not all credits can be given in the same year.</td>
</tr>
<tr>
<td>New England</td>
<td>Bachelor of Commerce Bachelor of Financial Administration Bachelor of Economics Bachelor of Agricultural Economics Bachelor of Agribusiness Bachelor of Commerce/Economics Combined Bachelor of Commerce/Law Combined Bachelor of Financial Administration/Law</td>
<td>Up to 12 subjects (8 subjects are equivalent to one full year of study)</td>
<td></td>
</tr>
<tr>
<td>Wollongong</td>
<td>Bachelor of Commerce</td>
<td>Up to 48 credit points for subjects in the first and second year (48 credit points are equivalent to one full year of study)</td>
<td></td>
</tr>
<tr>
<td>TAFE NSW - Sydney Institute Course</td>
<td>University</td>
<td>Degree Course</td>
<td>Credit Agreement</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4293 Advanced Diploma of Mechanical Technology</td>
<td>Wollongong</td>
<td>Bachelor of Engineering</td>
<td>Up to one-year credit for students with a good average grade. Credit may be given for subjects in any year.</td>
</tr>
<tr>
<td></td>
<td>Newcastle</td>
<td>Bachelor of Engineering (Mechatronics)</td>
<td>Up to 65 credit points (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td>6788 Advanced Diploma of Electrical Technology</td>
<td>Newcastle</td>
<td>Bachelor of Engineering (Electrical)</td>
<td>Up to 125 credit points including some in year one and some in year two of the degree (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Mechatronics)</td>
<td>Up to 90 credit points (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Telecommunications)</td>
<td>Up to 100 credit points including some in year one and some in year two of the degree (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Computer)</td>
<td>Up to 100 units including some in year one and some in year two of the degree (80 units are equivalent to a full year)</td>
</tr>
<tr>
<td>6790 Advanced Diploma of Electrical Technology (Computer Technology)</td>
<td>Newcastle</td>
<td>Bachelor of Engineering (Mechatronics)</td>
<td>Up to 70 credit points (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Electrical)</td>
<td>Up to 125 credit points including some in year one and some in year two of the degree (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Computer)</td>
<td>Up to 100 credit points including some in year one and some in year two of the degree (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Engineering (Telecommunications)</td>
<td>Up to 100 credit points including some in year one and some in year two of the degree (80 credit points are equivalent to a full year)</td>
</tr>
<tr>
<td>TAFE NSW - Sydney Institute Course</td>
<td>University</td>
<td>Degree Course</td>
<td>Credit Agreement</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3664 Diploma of Information Technology (Network Engineering)</td>
<td>Newcastle</td>
<td>Bachelor of Information Science</td>
<td>Up to 90 credit points made up of subjects from year one and year two (80 credit points are equivalent to one year)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Computer Science</td>
<td>Up to 70 credit points made up of subjects from year one and year two (80 credit points are equivalent to one year). Extra 20 units if 3659 Certificate IV in Information Technology Programming is included</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor of Applied Information Technology</td>
<td>Up to 90 credit points made up of subjects from year one and year two (80 credit points are equivalent to one year)</td>
</tr>
<tr>
<td></td>
<td>Australian Catholic</td>
<td>Bachelor of Information Systems</td>
<td>Up to 80 credit points made up of subjects from year one and year two (80 credit points are equivalent to one year)</td>
</tr>
<tr>
<td></td>
<td>Macquarie</td>
<td>Bachelor of Computing and Information Systems</td>
<td>Up to 24 credit points of which 9 credit points are specific exemptions for first year units (24 credit points are equivalent to one year of study). Students must also have a strong background in Mathematics.</td>
</tr>
<tr>
<td></td>
<td>Western Sydney</td>
<td>Bachelor of Technology (Information Technology Support)</td>
<td>8 units (80 credit points). This is equivalent to one full year though may not all be given in same year</td>
</tr>
<tr>
<td>3635 Diploma of Information Technology (Web Site Production &amp; Management)</td>
<td>Newcastle</td>
<td>Bachelor of Applied Information Technology</td>
<td>Up to 90 credit points made up of subjects from year one and year two (80 credit points are equivalent to one year)</td>
</tr>
<tr>
<td></td>
<td>New England</td>
<td>Bachelor of Commerce/ Bachelor of Laws</td>
<td>Up to 12 subjects (8 subjects are equivalent to one full year)</td>
</tr>
</tbody>
</table>

This information comes from *Degree Express* - produced by TAFE NSW Sydney Institute, 2002. For more information on credit transfer arrangements, students should contact the relevant TAFE NSW institution and also check the university faculty/school handbooks and websites. Students can also contact the university faculty that offers the course a student wishes to enter.
3.8 Maths skills needed in jobs

Did you know?

- A fully skilled automotive body repairer must have good reading and basic mathematics and computer skills. Restoring automobiles to their original form requires such precision that body repairers must follow instructions and diagrams in technical manuals to make very precise three-dimensional measurements of the position of one body section relative to another.

- Carpenters need to have the ability to solve arithmetic problems quickly and accurately.

- Cashiers need basic mathematics skills and good manual dexterity.

- TAFE offers some 64 courses that rely on mathematical skills of varying degrees.

- “...employers set a lot of store by mathematical ability and are more likely to hire someone with maths training”. Ross Gittins, Economics Editor, *The Sydney Morning Herald*
3.9 Vocational learning: Research activities

ACTIVITY 1

Do you enjoy or are you good at Mathematics? Let’s investigate a range of jobs that need mathematical skills.

Access the following website:

The diagram shows a variety of careers needing mathematical skills.

1. List some of the careers that interest you from Level 3.

....................................................................................................
....................................................................................................

2. List some of the careers that interest you from Level 4.

....................................................................................................
....................................................................................................

3. What qualifications do you need for careers from Level 3?

....................................................................................................
....................................................................................................

4. What qualifications do you need for careers from Level 4?

....................................................................................................
....................................................................................................
ACTIVITY 2

The table below shows the change in job vacancies by industry (in thousands) between 1996 and 2001. Look at the table and answer the questions that follow.

<table>
<thead>
<tr>
<th>Industry</th>
<th>May 1996 '000</th>
<th>May 1997 '000</th>
<th>May 1998 '000</th>
<th>May 1999 '000</th>
<th>May 2000 '000</th>
<th>May 2001 '000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>3.7</td>
<td>1.5</td>
<td>1.1</td>
<td>1.1</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>10.7</td>
<td>7.5</td>
<td>8.3</td>
<td>12.2</td>
<td>*12.2</td>
<td>*8.4</td>
</tr>
<tr>
<td>Electricity, gas and water supply</td>
<td>0.2</td>
<td>0.3</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Construction</td>
<td>1.5</td>
<td>5.9</td>
<td>7.8</td>
<td>*4.6</td>
<td>*4.4</td>
<td>*3.4</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>2.9</td>
<td>6.4</td>
<td>7.6</td>
<td>*6.6</td>
<td>5.2</td>
<td>*5.9</td>
</tr>
<tr>
<td>Retail trade</td>
<td>13.2</td>
<td>9.0</td>
<td>15.5</td>
<td>9.0</td>
<td>8.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Accommodation, cafes and restaurants</td>
<td>3.7</td>
<td>6.0</td>
<td>4.5</td>
<td>8.9</td>
<td>*8.5</td>
<td>6.1</td>
</tr>
<tr>
<td>Transport and storage</td>
<td>2.4</td>
<td>0.7</td>
<td>1.7</td>
<td>*2.7</td>
<td>2.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Communication services</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>1.2</td>
<td>1.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>3.6</td>
<td>5.0</td>
<td>3.1</td>
<td>3.1</td>
<td>5.2</td>
<td>4.9</td>
</tr>
<tr>
<td>Property and business services</td>
<td>9.4</td>
<td>13.1</td>
<td>22.5</td>
<td>*17.2</td>
<td>*20.0</td>
<td>15.3</td>
</tr>
<tr>
<td>Government administration and defence</td>
<td>2.5</td>
<td>3.3</td>
<td>3.8</td>
<td>4.7</td>
<td>4.9</td>
<td>5.9</td>
</tr>
<tr>
<td>Education</td>
<td>2.8</td>
<td>2.8</td>
<td>3.7</td>
<td>3.1</td>
<td>6.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Health and community services</td>
<td>5.9</td>
<td>7.9</td>
<td>7.7</td>
<td>7.7</td>
<td>9.7</td>
<td>11.0</td>
</tr>
<tr>
<td>Cultural and recreational services</td>
<td>1.3</td>
<td>1.9</td>
<td>1.2</td>
<td>*3.1</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Personal and other services</td>
<td>2.6</td>
<td>1.2</td>
<td>3.5</td>
<td>*3.4</td>
<td>*8.4</td>
<td>4.5</td>
</tr>
<tr>
<td>All industries</td>
<td>66.7</td>
<td>72.7</td>
<td>92.5</td>
<td>88.9</td>
<td>102.1</td>
<td>83.4</td>
</tr>
</tbody>
</table>

Source: Australian Bureau of Statistics

1. Which industry had the greatest job vacancies in May 1996?
........................................................................................................................................

2. Which industry had the greatest job vacancies in May 2001?
........................................................................................................................................

3. Which industries had consistently high levels of job vacancies between 1996 and 2001?
........................................................................................................................................

4. Why do you think statistics such as these are helpful when deciding on a career?
........................................................................................................................................

5. Round off each of the figures to the nearest whole number (in thousands) and draw a column graph to represent the information contained in the table.
**ACTIVITY 3**

The tables below show average weekly total earnings for different occupation groups and categories of employees in May 2000. Average weekly total earnings vary considerably across occupations. Read through the information and answer the questions that follow.

**Average weekly total earnings: Occupation by category of employee**

**May 2000**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Managerial</th>
<th>Non-managerial</th>
<th>Total</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adult $</td>
<td>Adult $</td>
<td>Total</td>
<td>Adult $</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Junior $</td>
<td></td>
<td>Total employees $</td>
</tr>
<tr>
<td><strong>MALES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers and administrators</td>
<td>1,363.20</td>
<td>1,132.70</td>
<td>. .</td>
<td>1,132.70</td>
</tr>
<tr>
<td>Professionals</td>
<td>1,286.30</td>
<td>1,039.60</td>
<td>457.00</td>
<td>1,038.80</td>
</tr>
<tr>
<td>Associate professionals</td>
<td>859.40</td>
<td>944.60</td>
<td>368.50</td>
<td>939.00</td>
</tr>
<tr>
<td>Tradespersons and related workers</td>
<td>679.40</td>
<td>810.00</td>
<td>378.80</td>
<td>759.90</td>
</tr>
<tr>
<td>Advanced clerical and service workers</td>
<td>712.60</td>
<td>806.40</td>
<td>407.00</td>
<td>803.40</td>
</tr>
<tr>
<td>Intermediate clerical, sales and service workers</td>
<td>849.60</td>
<td>751.30</td>
<td>311.50</td>
<td>734.20</td>
</tr>
<tr>
<td>Intermediate production and transport workers</td>
<td>621.10</td>
<td>796.30</td>
<td>393.40</td>
<td>790.70</td>
</tr>
<tr>
<td>Elementary clerical, sales and service workers</td>
<td>580.90</td>
<td>684.50</td>
<td>381.60</td>
<td>666.10</td>
</tr>
<tr>
<td>Labourers and related workers</td>
<td>644.30</td>
<td>696.60</td>
<td>366.20</td>
<td>681.80</td>
</tr>
<tr>
<td>All occupations</td>
<td>1,132.90</td>
<td>835.90</td>
<td>370.70</td>
<td>814.80</td>
</tr>
<tr>
<td><strong>FEMALES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers and administrators</td>
<td>1,153.00</td>
<td>1,012.50</td>
<td>. .</td>
<td>1,012.50</td>
</tr>
<tr>
<td>Professionals</td>
<td>1,056.10</td>
<td>896.70</td>
<td>326.80</td>
<td>896.50</td>
</tr>
<tr>
<td>Associate professionals</td>
<td>706.90</td>
<td>747.90</td>
<td>372.00</td>
<td>743.30</td>
</tr>
<tr>
<td>Tradespersons and related workers</td>
<td>*592.80</td>
<td>584.50</td>
<td>276.70</td>
<td>523.10</td>
</tr>
<tr>
<td>Advanced clerical and service workers</td>
<td>519.60</td>
<td>696.60</td>
<td>387.50</td>
<td>693.70</td>
</tr>
<tr>
<td>Intermediate clerical, sales and service workers</td>
<td>699.00</td>
<td>624.40</td>
<td>330.20</td>
<td>610.30</td>
</tr>
<tr>
<td>Intermediate production and transport workers</td>
<td>374.20</td>
<td>585.70</td>
<td>315.40</td>
<td>574.80</td>
</tr>
<tr>
<td>Elementary clerical, sales and service workers</td>
<td>452.40</td>
<td>563.50</td>
<td>315.40</td>
<td>534.40</td>
</tr>
<tr>
<td>Labourers and related workers</td>
<td>n.p.</td>
<td>566.20</td>
<td>361.70</td>
<td>561.00</td>
</tr>
<tr>
<td>All occupations</td>
<td>889.60</td>
<td>706.20</td>
<td>320.20</td>
<td>691.30</td>
</tr>
<tr>
<td><strong>PERSONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers and administrators</td>
<td>1,315.90</td>
<td>1,094.30</td>
<td>. .</td>
<td>1,094.30</td>
</tr>
<tr>
<td>Professionals</td>
<td>1,227.90</td>
<td>963.30</td>
<td>435.90</td>
<td>966.90</td>
</tr>
<tr>
<td>Associate professionals</td>
<td>809.30</td>
<td>863.90</td>
<td>370.20</td>
<td>858.60</td>
</tr>
<tr>
<td>Tradespersons and related workers</td>
<td>676.90</td>
<td>792.70</td>
<td>364.90</td>
<td>740.00</td>
</tr>
<tr>
<td>Advanced clerical and service workers</td>
<td>535.80</td>
<td>715.00</td>
<td>390.20</td>
<td>712.10</td>
</tr>
<tr>
<td>Intermediate clerical, sales and service workers</td>
<td>764.10</td>
<td>671.10</td>
<td>324.20</td>
<td>655.60</td>
</tr>
<tr>
<td>Intermediate production and transport workers</td>
<td>610.30</td>
<td>772.80</td>
<td>371.50</td>
<td>765.90</td>
</tr>
<tr>
<td>Elementary clerical, sales and service workers</td>
<td>513.40</td>
<td>620.80</td>
<td>335.60</td>
<td>594.70</td>
</tr>
<tr>
<td>Labourers and related workers</td>
<td>618.90</td>
<td>666.00</td>
<td>365.50</td>
<td>653.90</td>
</tr>
<tr>
<td>All occupations</td>
<td>1,066.60</td>
<td>783.50</td>
<td>352.30</td>
<td>765.10</td>
</tr>
</tbody>
</table>

Source: Australian Bureau of Statistics
**ACTIVITY 3 (cont.)**

1. Which occupation had the highest average weekly income (all employees)?
   ........................................................................................................

2. Was this the same for male and female employees?
   ........................................................................................................

3. What is the difference in the average weekly incomes of the males and females in this occupation?
   ........................................................................................................

4. Which occupation had the lowest average weekly income (all employees)?
   ........................................................................................................

5. Was this the same for male and female employees?
   ........................................................................................................

6. What was the difference in the average weekly incomes of males and females for this occupation?
   ........................................................................................................

7. What type of jobs attracted higher average weekly incomes? Can you explain why?
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................

8. Do you think that average weekly income also depends on academic or vocational qualifications? Why?
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................

9. Calculate the percentage of occupations listed that earn $800 or more as an average weekly income.
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
ACTIVITY 4
Do you know what career you want to pursue after you leave school? Do you know what your strengths and skills are?
Access the following website and explore career path planning and find out more about yourself!


ACTIVITY 5
Access the following website and explore careers for students who can do maths!


In this website click on the **Cashier** link then answer the following questions.

1. What do these workers do?

2. What type of preparation is needed for the job?

3. List other jobs that are similar to a cashier’s job.

4. In this website click on the **Mechanic** link and research what the job is like. What are some similar jobs linked to a mechanic’s job?
### 3.10 Mathematics at university: Areas of study

Some areas of study at university that may be of interest to students who study Mathematics subjects and courses at school include:

<table>
<thead>
<tr>
<th>Agriculture and Rural Studies</th>
<th>Medical Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture and Building</td>
<td>Medicine</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Nursing</td>
</tr>
<tr>
<td>Business</td>
<td>Optometry</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Pathology</td>
</tr>
<tr>
<td>Conservation Studies</td>
<td>Pharmacology</td>
</tr>
<tr>
<td>Demography/Population Studies</td>
<td>Physics</td>
</tr>
<tr>
<td>Education</td>
<td>Pharmacy</td>
</tr>
<tr>
<td>Engineering</td>
<td>Physiology</td>
</tr>
<tr>
<td>Engineering:</td>
<td></td>
</tr>
<tr>
<td>Food Science and Technology</td>
<td>Statistics</td>
</tr>
<tr>
<td>Geography</td>
<td>Surveying</td>
</tr>
<tr>
<td>Health Sciences</td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Enterprise Management, Management, Operations Management, Quality Management</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.11 Mathematics at university: A pathway to careers

Did you know?

- Mathematics underlies the framework of vast areas of technology, business, the environment and the physical, biological and social sciences.

- Mathematics graduates find jobs in a variety of careers, often in areas not necessarily associated with Mathematics.

- Graduates who have majored in computer sciences, computing and mathematics and physical sciences are in the top one-third of income earners. (Source: *The Australian Higher Education Supplement*, 24/1/2001).


- Based on 2001 data, median starting salaries for mathematics graduates in their first year of employment are $37,000 - $40,000. This compares with an overall median for all graduates of $35,000. (Source: Gradlink).

- Employment rates for Bachelor degree students are 93% (Mathematical Sciences), 94% (Computing and Mathematics), and 99% (Computer Science) (Source: Australian Mathematics Society Jobs for Mathematicians Centre).

Mathematics graduates are in demand in the following fields in order of intake:

1. government (including defence)
2. miscellaneous
3. teaching
4. logistics
5. business
6. finance
7. computing
8. research
9. academic
Career Opportunities

Here are some jobs and companies where the employer has specified people with Mathematics skills, sourced from the Australian Mathematics Society website.

- analyst, electricity pricing
- analyst, Macquarie Bank
- risk analyst, finance company
- traffic algorithm development manager, RTA NSW
- Mathematics teachers
- research scientist, CSIRO (various)
- Australian Bureau of Statistics
- trader analyst
- logistics analyst
- actuary
- mathematics consultant (government)
- analysts, Australian Securities and Investments
- Department of Health
- systems engineer
- research officer, Police Department
- scientist, Johnson & Johnson
- business analyst, Workcover
- numerical modeller
- Environment Australia.
3.12 Mathematics at university: Interesting careers

ACTIVITY 6

To look at some interesting careers involving Mathematics, log onto the website: http://www.maths.qut.edu.au/careers/index.jsp

“Mathematicians by nature but not by name”

This website clearly shows the variety and diversity of careers available with a background in mathematics at university level.

Click on the Environmental Modeller link. Read the profile for Sama Low Choy and answer the following questions:

1. What is Sama’s work title?
   ....................................................................................................

2. What organisation does she work for?
   ....................................................................................................

3. Describe her role within this organisation.
   ....................................................................................................
   ....................................................................................................
   ....................................................................................................

4. What type of work does Sama do in her role?
   ....................................................................................................
   ....................................................................................................
   ....................................................................................................

5. What was Sama’s main career interest?
   ....................................................................................................

6. Sama combined her interest in mathematics with what other area of study?
   ....................................................................................................

7. How many other careers are listed on this page that are linked to mathematics?
   ....................................................................................................

8. Choose one of the other careers listed and outline the types of tasks carried out by the person featured. Would you have known that maths plays such an important role in this career?
   ....................................................................................................
   ....................................................................................................

Now click on Home to get to the home page of this site. Explore the courses offered in maths and read about their industry focus.

From the home page, click on Pizza Game. Can you beat the computer?
3.13 School to work pathways
3.14 Vocational learning resources for teachers and students

The following resources may be helpful to students who research careers and courses related to MATHEMATICS. Teachers and students may collect and add additional resources to this list.

**Handbooks**
- The most recent version of the *NSW UAC Guide* [www.uac.edu.au](http://www.uac.edu.au)
- The most recent version of the *TAFE NSW HANDBOOK* [www.tafensw.edu.au](http://www.tafensw.edu.au)
- The most recent version of the *HSC/TAFE Credit Transfer Guide* [www.det.nsw.edu.au/hsctafe](http://www.det.nsw.edu.au/hsctafe)
- The careers section of the most recent local/state newspaper.
- The most recent version of ‘The Right Choice’ *TAFE NSW* [www.tafensw.edu.au](http://www.tafensw.edu.au)

Note: Schools located near other states should explore interstate handbooks.

**Booklets**
- *Aboriginal Career Aspirations Program*, Board Of Studies (distributed to schools 2002).
- *Making Choices* (work sheets and CD Rom) Career Education Association of WA.

**Multimedia**

**Other useful resources (list here)**
- 
- 
- 
- 
- 
- 
-
Useful websites

The VET in Schools Directorate has developed this website for teachers, parents and students to provide information on and links to VET in Schools.

- [www.myfuture.edu.au](http://www.myfuture.edu.au)
  Australia's electronic career information service has an ‘assist others’ link from school Mathematics subjects and HSC courses to careers and tertiary courses.

  Designed for teachers, this website supports the NSW Government’s *Ready for Work, School to Work Program*. (This website has been updated and now redirects to [http://www.det.nsw.edu.au/vetinschools/schooltowork/index.htm](http://www.det.nsw.edu.au/vetinschools/schooltowork/index.htm)).

  This is a website with a career interest test.

- [www.newapprenticeships.gov.au](http://www.newapprenticeships.gov.au)
  A national website for traineeships and apprenticeships, it contains the most up to date information on new apprenticeships including new apprenticeship centres in your region.

- [http://apprenticeship.det.nsw.edu.au](http://apprenticeship.det.nsw.edu.au)
The Department of Education website lists up to date information and statistics on traineeships and apprenticeships in NSW.

  One of Australia’s leading student and graduate employment and career resource websites, it contains over 35,000 jobs online. Do a ‘quick job search’ by typing ‘mathematics’ as a keyword and discover a plethora of jobs available requiring Mathematics skills.


- [www.boardofstudies.nsw.edu.au](http://www.boardofstudies.nsw.edu.au)
  This website includes details of the Board of Studies Mathematics curriculum.

- [www.det.nsw.edu.au](http://www.det.nsw.edu.au)
The Department of Education and Training has a ‘Training and Industry’ link to BVET, Apprenticeships NSW, VETAB, industry programs, training market and new apprenticeship centres.

Other useful websites (list here)

- [www.myfuture.edu.au](http://www.myfuture.edu.au)


- [www.newapprenticeships.gov.au](http://www.newapprenticeships.gov.au)


- [www.boardofstudies.nsw.edu.au](http://www.boardofstudies.nsw.edu.au)

- [www.det.nsw.edu.au](http://www.det.nsw.edu.au)