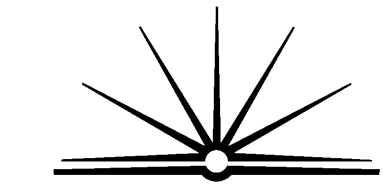


Graphics Technology
Years 7–10

Advice on Programming and Assessment

© 2003 Copyright Board of Studies NSW for and on behalf of the Crown in right of the State of New South Wales.

This document contains Material prepared by the Board of Studies NSW for and on behalf of the State of New South Wales. The Material is protected by Crown copyright.

All rights reserved. No part of the Material may be reproduced in Australia or in any other country by any process, electronic or otherwise, in any material form or transmitted to any other person or stored electronically in any form without the prior written permission of the Board of Studies NSW, except as permitted by the *Copyright Act 1968*. School students in NSW and teachers in schools in NSW may copy reasonable portions of the Material for the purposes of bona fide research or study.

When you access the Material you agree:
- to use the Material for information purposes only
- to reproduce a single copy for personal bona fide study use only and not to reproduce any major extract or the entire Material without the prior permission of the Board of Studies NSW
- to acknowledge that the Material is provided by the Board of Studies NSW
- not to make any charge for providing the Material or any part of the Material to another person or in any way make commercial use of the Material without the prior written consent of the Board of Studies NSW and payment of the appropriate copyright fee
- to include this copyright notice in any copy made
- not to modify the Material or any part of the material without the express prior written permission of the Board of Studies NSW.

The Material may contain third party copyright materials such as photos, diagrams, quotations, cartoons and artworks. These materials are protected by Australian and international copyright laws and may not be reproduced or transmitted in any format without the copyright owner's specific permission. Unauthorised reproduction, transmission or commercial use of such copyright materials may result in prosecution.

The Board of Studies has made all reasonable attempts to locate owners of third party copyright material and invites anyone from whom permission has not been sought to contact the Copyright Officer, ph (02) 9367 8289, fax (02) 9279 1482.

Published by
Board of Studies NSW
GPO Box 5300
Sydney NSW 2001
Australia

Tel: (02) 9367 8111
Fax: (02) 9367 8484
Internet: www.boardofstudies.nsw.edu.au

November 2003

ISBN 1 7409 9854 5

2003578

Contents

1 Introduction 5
2 Establishing a Scope and Sequence Plan 6
2.1 Sample Stage 5 Scope and Sequence Plan 8
2.2 Stage 5 Unit Overviews 9
3 Advice on Assessment 12
3.1 Assessment for Learning 12
3.2 Planning for Effective Learning and Assessment 13
3.3 Designing Effective Learning and Assessment 15
3.4 Annotated Assessment for Learning Activity 15
3.5 Sharing Learning and Assessment Intentions 19
3.6 Effective Feedback to Students 19
3.7 Recording Evidence for Assessment 19
4 Programming Units of Work 21
4.1 Sample Unit Proformas 22
5 Sample Units of Work 23
5.1 Stage 5 Sample Unit of Work: Core Module 1 – Children's Toys 24
5.1.1 Sample assessment for learning activity: Elementary Rendering 29
5.2 Stage 5 Sample Unit of Work: Core Module 2 – Household Appliances 32
5.2.1 Sample assessment for learning activity: Multimedia Presentation 36
5.3 Stage 5 Sample Unit of Work: Option Module – Engineering Drawing 38
5.3.1 Sample assessment for learning activity: Item and Assembly Drawings 42

1 Introduction

This support document has been designed to help teachers understand key aspects of the new *Graphics Technology Years 7–10 Syllabus* and to provide guidance for implementation. The document shows how these aspects can be incorporated in teaching and learning programs, and how these programs are underpinned by the principles of *assessment for learning* (*Graphics Technology Years 7–10 Syllabus*, page 61).

The document provides advice about constructing a program that will cover the scope of Graphics Technology for a stage. It sets out a process for planning and sequencing units of work, and developing teaching and learning activities.

The sample stage program plans and the sample units of work in this document demonstrate ways in which teachers can build a teaching and learning program and develop units of work to ensure coverage of the scope of the syllabus.

The document contains three sample Stage 5 units of work:
- Core Module 1 – Children's Toys
- Core Module 2 – Household Appliances
- Option Module – Engineering Drawing – Clamping and Holding Devices.

These sample units can be used as models for planning units of work. They include:
- relevant outcomes and content
- assessment activities that have been designed and integrated into the units of work
- different types of possible feedback
- a variety of teaching and learning experiences
- opportunities for student reflection.

An assessment activity from each unit has been selected to show how assessment can fit into teaching and learning sequences. They are described in some detail to illustrate the process of *assessment for learning*. Teachers would not provide this level of detail in day-to-day classroom situations. The units of work and activities may be modified or amended to suit the needs, interests and abilities of students.

For a small percentage of students with special education needs who are undertaking Life Skills outcomes and content, support materials will be provided which will assist in the development of a meaningful and relevant program of study related to the *Graphics Technology Years 7–10 Syllabus*. Units of work adapted for students undertaking Graphics Technology Life Skills will be included in a consolidated document that will be distributed to schools early in 2004.

2 Establishing a Scope and Sequence Plan

A fundamental step in the design of effective teaching and learning programs is the development of a scope and sequence plan. This plan provides an overview of the units to be taught and details the placement, sequence and duration of units. When establishing a scope and sequence plan, teachers should consider the following.

Syllabus requirements
The major emphasis of the *Graphics Technology Years 7–10 Syllabus* is on the design, development and production of graphical presentations. The syllabus promotes a 'learning through doing' approach to content delivery and requires the active engagement of students in the production of graphical presentations throughout the course.

The course content is divided into two core modules (compulsory for both 100-hour and 200-hour courses) and thirteen option modules (of which four must be studied in a 200-hour course). In selecting and sequencing option modules teachers should ensure that the learning experiences:

- build on previous learning experiences that increase in sophistication and student autonomy as students progress through the course
- provide a range of experiences over the course
- cater for the needs, interests and abilities of students and/or for areas of community significance
- provide an avenue for the delivery of all essential syllabus content
- can effectively be undertaken in accordance with relevant guidelines and directives of their education authorities and/or schools.

Flexibility
When planning implementation of the syllabus, teachers should consider which model best suits their school curriculum structure and allows for the most effective use of resources. To assist with this, the syllabus structure allows for the sequential delivery of modules (semesterised program) or the concurrent delivery of modules (yearly program). Concurrent delivery of modules also allows for a thematic approach to the programming of syllabus content.

Assessment
When planning projects or themes teachers should consider:

- which sections of essential content will be addressed by each project
- the range of outcomes to be assessed
- the range of assessment strategies to be employed.

Individual assessment activities need not necessarily address complete outcomes but may focus on parts or combinations of outcomes. However, it is essential that all outcomes are fully addressed by the end of the course – whether it is a 100-hour or 200-hour course.

It takes many weeks' work to produce graphical presentations of a substantial nature. When assessing these presentations, teachers should reflect on the principles of assessment for learning and their observations of students during the unit. That is, they should not focus solely on the completed presentation. Teachers may consider other elements of students' work practices, such as cooperative work practices, self-direction and time management in the overall assessment of the presentations.

Further considerations

Teachers need to be aware of and follow the relevant guidelines and directives of their education authorities and/or schools. Teaching programs should recognise and reflect relevant State and Commonwealth legislation, regulations and standards including Occupational Health and Safety, Chemical Safety in Schools and Animal Welfare guidelines. Teachers need to be aware of activities that may require notification, certification, permission, permits and licences.

2.1 Sample Stage 5 Scope and Sequence Plan

The scope and sequence information presented in the following example provides an overview for a 200-hour course for Stage 5. The delivery of the course content in Core Modules 1 and 2 has a thematic approach, while in the option modules the delivery is through the modules' specific focuses.

The model presented illustrates the sequential delivery of modules. However, teachers could choose to deliver modules concurrently by integrating the content of two or more modules into an overall theme.

There are opportunities to address aspects of all syllabus outcomes in each unit of work. However, teachers could choose to place particular emphasis on specific outcomes in individual units of work. Regardless of the approach taken by a teacher, it is essential that all outcomes are addressed by the completion of the course.

<table>
<tr><th>Term</th><th>Year 9</th><th>Year 10</th></tr>
<tr><td>1</td><td rowspan="2">Core Module 1
Unit 1: Logos and Pictograms
(5 weeks)
Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2
Unit 2: Communication Devices
(8 weeks)
Outcomes: 5.1.1, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1</td><td rowspan="2">Option 1: Computer Aided Design and Drafting
(10 weeks)
Outcomes: 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.4.2, 5.5.1, 5.5.2, 5.6.1, 5.6.2</td></tr>
<tr><td>2</td></tr>
<tr><td rowspan="2">2</td><td>Unit 3: Children's Toys
(7 weeks)
Outcomes: 5.1.1, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.2, 5.6.1</td><td rowspan="2">Option 2: Engineering Drawing
(10 weeks)
Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2</td></tr>
<tr><td rowspan="2">3</td><td>Core Module 2</td></tr>
<tr><td>Unit 4: Household Appliances
(7 weeks)
Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.4.2, 5.5.2, 5.6.1</td><td>Option 3: Cabinet and Furniture Drawing
(10 weeks)
Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Unit 5: Transportation
(7 weeks)
Outcomes: 5.1.1, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2
Unit 6: Packaging
(6 weeks)
Outcomes: 5.1.1, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2</td><td rowspan="2">Option 4: Australian Architecture
(10 weeks)
Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2</td></tr>
</table>

Note: Children's Toys, Household Appliances and Engineering Drawing are described in detail in the following pages.

2.2 Stage 5 Unit Overviews

Year 9

Core Module 1

Unit 1: **Logos and Pictograms** (5 weeks) Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	Students are introduced to elementary drafting techniques and the use and care of both manual and computer-based drafting equipment. Through the production of a variety of logos and pictograms they learn how to perform geometric constructions including the drafting of regular geometric shapes, division of lines and transfer of distances. They learn about the design of logos and pictograms and their importance to everyday communication. The unit also provides scope to introduce the social implications of the production of graphical images.
Unit 2: **Communication Devices** (8 weeks) Outcomes: 5.1.1, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1	Students focus on the production of drawings of common communication devices such as clock radios, cassette players and mobile phones. They become practised in the principles of orthogonal and pictorial drawing and the associated standards and conventions. They become aware of and apply standards for dimensioning, and understand and apply scales in the production of drawings. Students also further develop their skills in the production of freehand, manual and computer-based drafting techniques.
Unit 3: **Children's Toys** (7 weeks) Outcomes: 5.1.1, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.2, 5.6.1	Students work towards the development of presentation drawings that could be used to market a concept for a new toy design to a prospective manufacturer. Building on the experiences of the previous two modules, students further develop their skills in the production of drawings through the use of both manual and computer-based drafting technologies. A particular emphasis is placed on pictorial drawing and the development of skills in rendering, and the selection and use of appropriate presentation styles and techniques for the purposes of marketing.

Year 9

Core Module 2

Unit 4: **Household Appliances** (7 weeks) Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.4.2, 5.5.2, 5.6.1	Students focus on the production of drawings of common household appliances. Through the production of drawings of common household appliances such as toasters, hair dryers and microwave ovens, students refine skills in pictorial and orthogonal drawing techniques. Using a suitable CAD package they learn about 3D modelling and prepare a 3D model of a selected appliance. They learn about multimedia presentation techniques and integrate graphics and drawings into a multimedia presentation of their own design.
Unit 5: **Transportation** (7 weeks) Outcomes: 5.1.1, 5.2.1, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	Using transportation devices and their components as a basis for the drawings produced in this unit, students build on previous experiences in orthogonal projection. They are introduced to assembly drawings, sectional views and engineering drawing standards and conventions. They gain experience in the use of a variety of available templates used to reproduce common drawing elements. Students also gain experience in the production of engineering drawings in both the manual and CAD environments. They investigate the work of engineers and the application of graphics to the field of engineering.
Unit 6: **Packaging** (6 weeks) Outcomes: 5.1.1, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	Following a theme of packaging, this unit has an emphasis on 'Design in Graphics', which includes design principles and processes, research and collaborative work environments. Students are introduced to and become practised in the production of developments of geometric solids. They are also introduced to perspective pictorial drawing. Skills in isometric projection and rendering, developed in previous units, are also enhanced throughout this unit. Students investigate the work of graphic designers, in particular their role in the design and development of product packaging. As in previous units students are engaged in producing drawings using both manual and computer-based drafting technologies.

Year 10

Option Module 1: **Computer Aided Design and Drafting** (10 weeks) Outcomes: 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.4.2, 5.5.1, 5.5.2, 5.6.1, 5.6.2	This module extends students' knowledge and understanding of, and skills in, graphics technology with a particular emphasis on the standards and presentation methods used in Computer Aided Design and Drafting. In this unit students undertake a consolidated study of the application and use of computer-based design and drafting technologies. They produce a range of computer-generated graphical images for design, production and manufacturing purposes.
Option Module 2: **Engineering Drawing** (10 weeks) Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	The Engineering Drawing module extends students' knowledge and understanding of, and skills in, graphics technology with a particular emphasis on the standards and presentation methods used in engineering. The unit focuses on the production of a range of engineering drawings to illustrate a variety of clamping and holding devices commonly found in the school workshop. Students develop further knowledge and skills in both manual and computer-based drafting techniques.
Option Module 3: **Cabinet and Furniture Drawing** (10 weeks) Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	The Cabinet and Furniture Drawing module extends students' knowledge and understanding of, and skills in, graphics technology with a particular emphasis on the standards and presentation methods used in the furniture and cabinet-making industries. The unit focuses on the development of working drawings suitable for use in the manufacture and assembly of a range of furniture products. Students also investigate the use of drawings in assembly instuctions for ready-to-assemble products.
Option Module 4: **Australian Architecture** (10 weeks) Outcomes: 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.4.1, 5.5.1, 5.5.2, 5.6.1, 5.6.2	This module extends students' knowledge and understanding of, and skills in, graphics technology with a particular emphasis on Australian architecture, its standards, building characteristics and historical qualities. Students apply acquired knowledge and skills to the development of site plans, floor plans, elevations and detail drawings. They also investigate in detail Australian architectural styles and the influences on Australian building design.

3 Advice on Assessment

3.1 Assessment for Learning

The Board's revised syllabuses advocate *assessment for learning*. Assessment that enhances learning recognises that learners use their current understanding to discover, develop and incorporate new knowledge, understanding and skills. *Assessment for learning* helps teachers and students to know if that current understanding is a suitable basis for future learning.

Assessment occurs as an integral part of teaching and learning. Teacher instruction and assessment influence student learning and learning processes. This involves using assessment activities to clarify student understanding of concepts, and planning ways to remedy misconceptions and promote deeper understanding.

Assessment for learning encourages self-assessment and peer assessment. Students can develop and use a range of strategies to actively monitor and evaluate their own learning and the learning strategies they use.

The feedback that students receive from completing assessment activities will help teachers and students decide whether they are ready for the next phase of learning or whether they need further learning experiences to consolidate their knowledge, understanding and skills. Teachers should consider the effect that assessment and feedback have on student motivation and self-esteem, and the importance of the active involvement of students in their own learning.

By integrating learning and assessment, the teacher can choose which aspects of a student's performance to record. These records can be used to monitor the student's progress, determine what to teach next and decide the level of detail to be covered. At key points, such as the end of the year, this information is also available for the teacher to use to form a judgement of the student's performance against levels of achievement. This judgement can be used to inform parents, the next teacher and especially the student, of the student's progress. Consequently, teachers using their professional judgement in a standards-referenced framework are able to extend the process of *assessment for learning* into the assessment of learning.

Principles of assessment for learning
Assessment for learning:

AP1 emphasises the interactions between learning and manageable assessment strategies that promote learning

AP2 clearly expresses for the student and teacher the goals of the learning activity

AP3 reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark

AP4 provides ways for students to use feedback from assessment

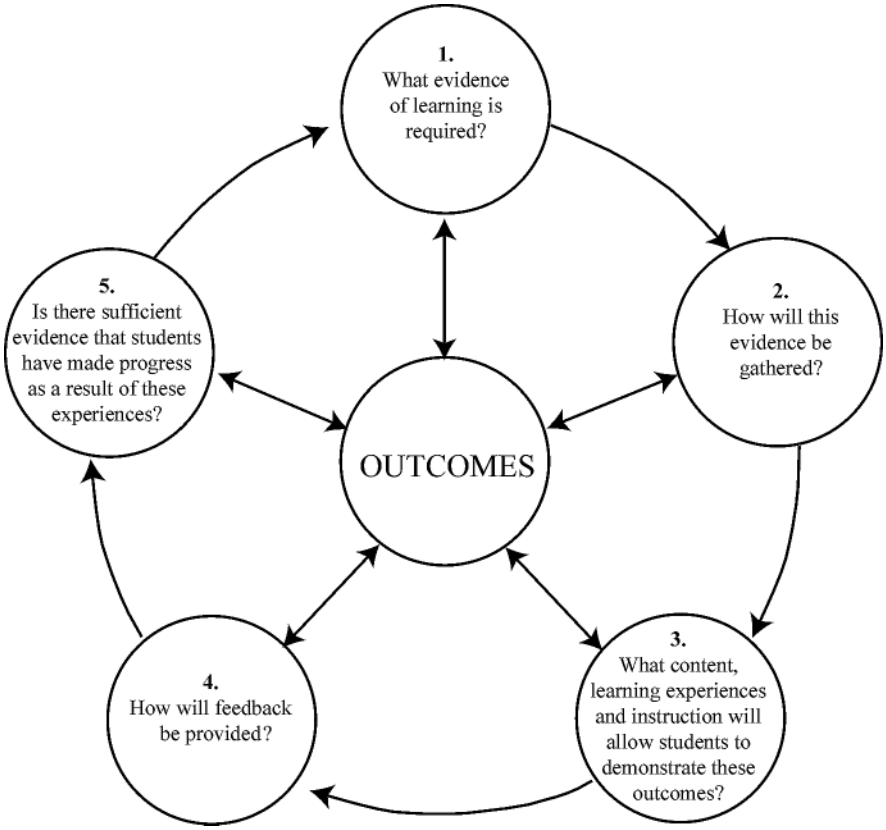
AP5 helps students take responsibility for their own learning

AP6 is inclusive of all learners.

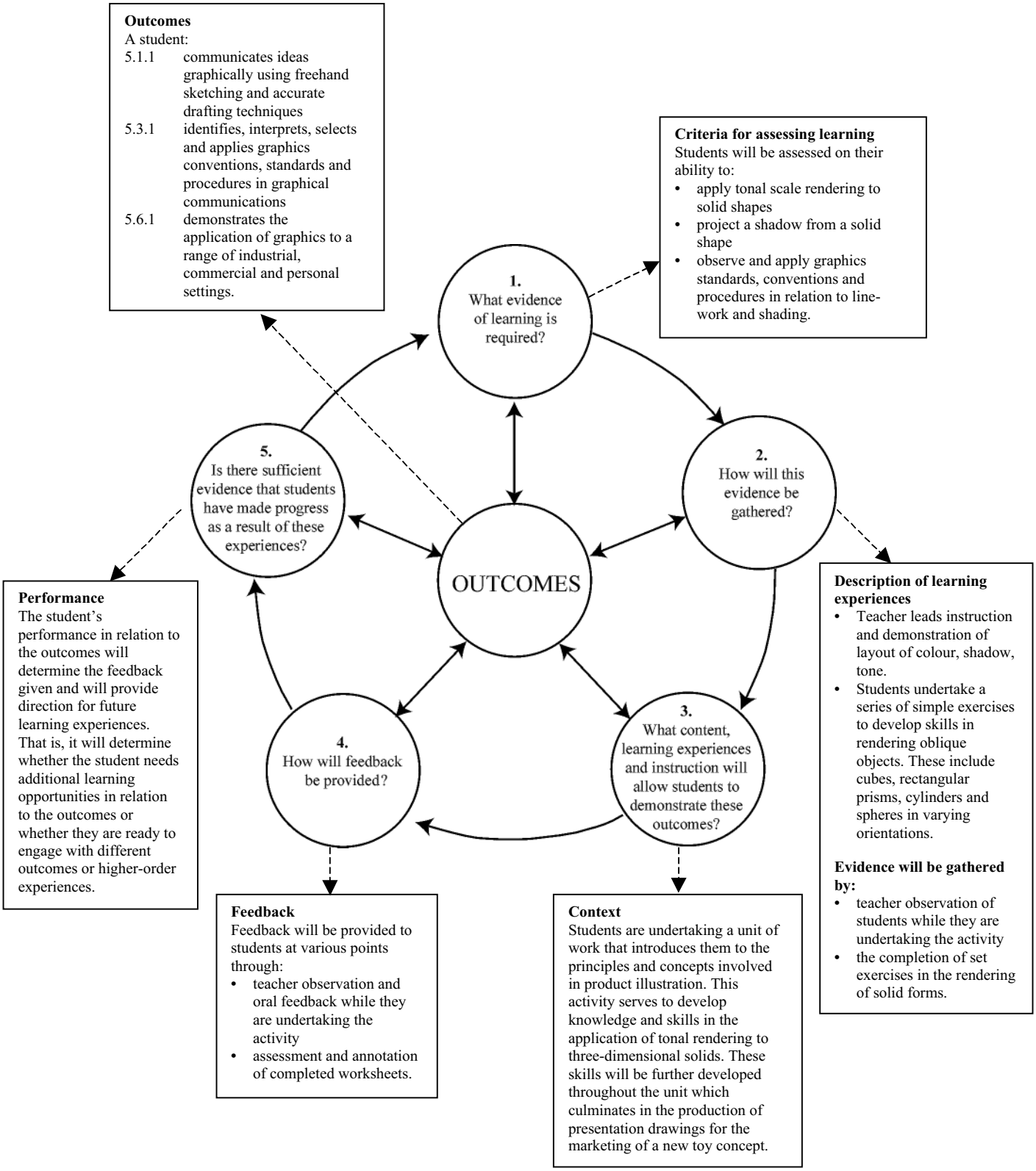
Details on how these principles translate in practice can be found on page 61 of the *Graphics Technology Years 7–10 Syllabus.* One activity in this document has been annotated to show how the principles of *assessment for learning* feature in that activity. It can be found on pages 16–17.

3.2 Planning for Effective Learning and Assessment

The diagram below summarises a model for integrating learning and assessment. It emphasises that outcomes are central to the decisions teachers make about the learning to be undertaken and the evidence of learning that needs to be collected. This evidence enables teachers to determine how well students are achieving in relation to the outcomes and to provide students with feedback on their learning. Evidence of learning assists teachers and students to decide if students are ready for the next phase of learning or if teachers need to adapt programs to provide further learning experiences to consolidate students' knowledge, understanding and skills.



The diagram below shows how this process has been applied in the design of the sample assessment for learning activity Elementary Rendering (pages 29–30).



3.3 Designing Effective Learning and Assessment

Designing effective learning experiences requires the selection of activities that develop students' knowledge, understanding and skills and that allow evidence of learning to be gathered. Methods of gathering evidence could include informal teacher observation, questioning, peer evaluation and self-evaluation, as well as more structured assessment activities. Assessment should be an integral part of each unit of work and should support student learning.

When designing assessment activities, teachers should consider whether the activity:

- has explicitly stated purposes that address the outcomes
- is integral to the teaching and learning program
- shows a clear relationship between the outcomes and content being assessed
- allows students to demonstrate the extent of their knowledge, understanding and skills
- focuses on what was taught in class and what students were informed would be assessed
- provides opportunities to gather information about what further teaching and learning is required for students to succeed
- provides valid and reliable evidence of student learning and is fair.

3.4 Annotated Assessment for Learning Activity

The *Assessment for Learning Principles* provide the criteria for judging the quality of assessment materials and practices. The Stage 5 sample assessment for learning activity Elementary Rendering has been annotated to show these principles.

The criteria used to annotate this activity are provided on page 16 and may be a useful tool in staff development activities.

Sample assessment for learning activity: Elementary Rendering

Context
Students are undertaking a unit of work to introduce them to the principles and concepts of product illustration. Prior to this they have undertaken preliminary work developing knowledge and skills in pictorial drawing with an emphasis on oblique projection. This activity is placed at the beginning of the unit and introduces students to elementary rendering concepts and techniques, in particular the use of tonal scales and shadow.

AP1 – The context of the activity shows how it forms part of the learning and how it links to learning goals.
AP3 – The activity models an approach that has the activity as an integral component of the learning.

Outcomes
A student:
5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques
5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.6.1 demonstrates the application of graphics to a range of industrial, co personal settings.

AP1 – The activity lists the outcomes to be addressed.

Description of activity
Using the worksheet supplied, students lead render oblique blocks in varying orientations. Consideration is given to the positioning of the light source and tonal scales of individual faces. They also project and render the shadow cast by the b

AP1 – The activity has a clear statement of purpose.
AP2 – The activity shows the knowledge, skills and understanding to be developed.
AP3 – The activity has been designed to target skills and understandings that lead to deeper learning as well as knowledge.
AP6 – The task allows for a range of student responses and is inclusive of all learners.

Criteria for assessing learning
(These criteria would normally be communicated to student

Students will be assessed on their ability to:
- apply tonal scale rendering to solid shapes
- project a shadow from a solid shape
- observe and apply graphics standards, conventions and procedures in relation to line-work and shading.

Guidelines for marking
The following guidelines for marking show one approach to assigning a value to a student's work. Other approaches may be used that better suit the reporting process of the school. Categories, marks, grades, visual representations or individual comments/notations may all be useful.

Range	A student in this range:
8–10 (High)	• applies tonal scales to surfaces consistent with light source • accurately projects shad • demonstrates a high de presentation
5–7 (Satisfactory)	• applies tonal scales to s • projects a shadow cons • line-work, shading and presentation completed to a satisfactory standard
1–4 (Progressing)	• applies shading to some surfaces, not necessarily consistent with light source • projects a shadow inconsistent with light source • line-work, shading and presentation require further development.

AP1 – The activity is appropriate for the outcomes being assessed.
AP2 – The link between the marking guidelines and the criteria for judging performance and the outcomes is clear and explicit.
AP4 – Marking guidelines and criteria for judging performance reflect the nature and intention of the activity.

Feedback

While undertaking this activity, students will be provided with regular and ongoing feedback. This may include individual instruction and demonstration of specific techniques. Completed worksheets will be assessed by the teacher. Written annotations will inform students on areas of success and areas for improvement. Comments will inform them about such things as:

- the application of tonal scales to individual surfaces
- the recognition of light source
- overall presentation.

AP3 – The activity reflects a view of learning in which assessment helps students learn better.
AP5 – The activity is designed to help students take responsibility for their own learning.

Students will be encouraged to reflect on the feedback provided on this activity before undertaking subsequent rendering activities.

Future directions

This activity develops knowledge and skills which will be further developed and applied throughout the unit, culminating in the development of presentation drawings of a pull-along toy. Evidence collected through this activity could serve to inform teachers about the students' readiness to move on to more complex tasks or could identify the need for supplementary activities to provide students with opportunities for the mastery of skills.

Assessment of the final presentation drawings will incorporate the assessment of rendering techniques and skills.

AP1 – The activity links to further learning.
AP4 – The activity provides ways for students to use feedback from assessment.

This activity is presented without annotations on pages 29–30.

Assessment for learning principles

The following table shows some of the criteria that have been used to annotate the assessment for learning activity in this document. This list of criteria is not exhaustive; it has been included to provide support in understanding the *assessment for learning* principles.

It is not envisaged that teachers will use this table as a checklist each time an assessment activity is developed. However, this could be a valuable tool for use in staff development activities.

Assessment principle 1	Related criteria
The activity emphasises the interactions between learning and manageable assessment strategies that promote learning.	• The activity has a clear statement of purpose. • The activity lists the outcome(s) to be addressed. • The activity is appropriate for the outcomes being assessed. • The activity forms part of the learning and has clear links to learning goals. • The activity shows the knowledge, skills and understanding that are being built on.

Assessment principle 2	Related criteria
The activity clearly expresses for the student and teacher the goals of the learning activity.	• The link between the guidelines for marking and/or criteria for judging performance and the outcomes is clear and explicit. • The language of the marking guidelines and/or criteria for judging performance and the outcomes is clear and explicit. • The activity clearly indicates the knowledge, skills and/or understanding to be developed.

Assessment principle 3	Related criteria
The activity reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark.	• The activity has the capacity to engage the learner. • The activity has been designed to target skills and understandings that lead to deeper learning as well as knowledge. • The activity models an approach that has the activity as an integral component of the learning.

Assessment principle 4	Related criteria
The activity provides ways for students to use feedback from assessment.	• Marking guidelines and/or criteria for judging performance reflect the nature and intention of the activity and will be expressed in terms of the knowledge and skills demanded by the activity. • Marking guidelines and/or criteria for judging performance enable meaningful and useful information on performance, relative to the outcomes, to be gathered and reported.

Assessment principle 5	Related criteria
The activity is designed to help students take responsibility for their own learning.	• The activity models ways that self and peer assessment can be used as valid means of assessment.

Assessment principle 6	Related criteria
The activity has been designed to be inclusive of all learners.	• The activity is inclusive of gender, ethnicity, and a variety of socio-economic and geographical groupings.

3.5 Sharing Learning and Assessment Intentions

Students must be aware of what they need to do to demonstrate evidence of learning. This information could be conveyed informally or formally by the teacher, as appropriate for the learning activity. Students should be informed of the criteria that will be used to assess their learning. They should be clear about the meaning of the language used, and the subject-specific terminology. They also need to be clear about any sources or stimulus material that are appropriate to the activity.

It may be helpful to give students models of good responses and templates, or procedures to help them demonstrate the extent of their knowledge, understanding and skills.

3.6 Effective Feedback to Students

The aim of feedback is to communicate to students how well their knowledge, understanding and skills are developing in relation to the outcomes. Feedback enables students to recognise their strengths and areas for development, and to plan with their teacher the next steps in their learning. They are then given opportunities to improve and further develop their knowledge, understanding and skills.

Teacher feedback about student work is essential for students and is integral to the teaching and learning process. Student self-reflection and peer evaluation can also provide valuable feedback to students. Students should be provided with regular opportunities to reflect on their learning.

Feedback should:
- focus on the activity and what was expected
- be constructive, providing meaningful information to students about their learning
- correct misunderstandings
- identify and reinforce students' strengths and state clearly how students can improve.

Forms of feedback include:
- oral discussion with class, groups or individual students
- written annotations
- general comments to the class about those aspects of the activity in which students excelled and those aspects that still need addressing
- examples of good responses
- peer evaluation and self-evaluation.

3.7 Recording Evidence for Assessment

Recording student performance needs to be manageable. Teachers should make decisions about which aspects of student performance on an activity should be recorded, and in what format. The teacher can use this information to ascertain students' progress, what needs to be taught next and to what level of detail, and to form a judgement of student achievement at key points.

Record-keeping should reflect the reporting processes of the school and may take the form of individual comments or notations, marks, grades or visual representations for the activities.

A scale such as the one below may be a useful way to summarise the extent of students' learning. This example shows how individual students performed on the same assessment activity.

Student	Activity – Elementary Rendering		
A			x
B		x	
C		x	
D		x	
E		x	
F	x		
	Progressing	Satisfactory	High

This method can be adapted to capture evidence of an individual student's strengths and weaknesses on various elements of one activity, or the performance of a particular student, class, group or cohort of students, across a range of assessment activities.

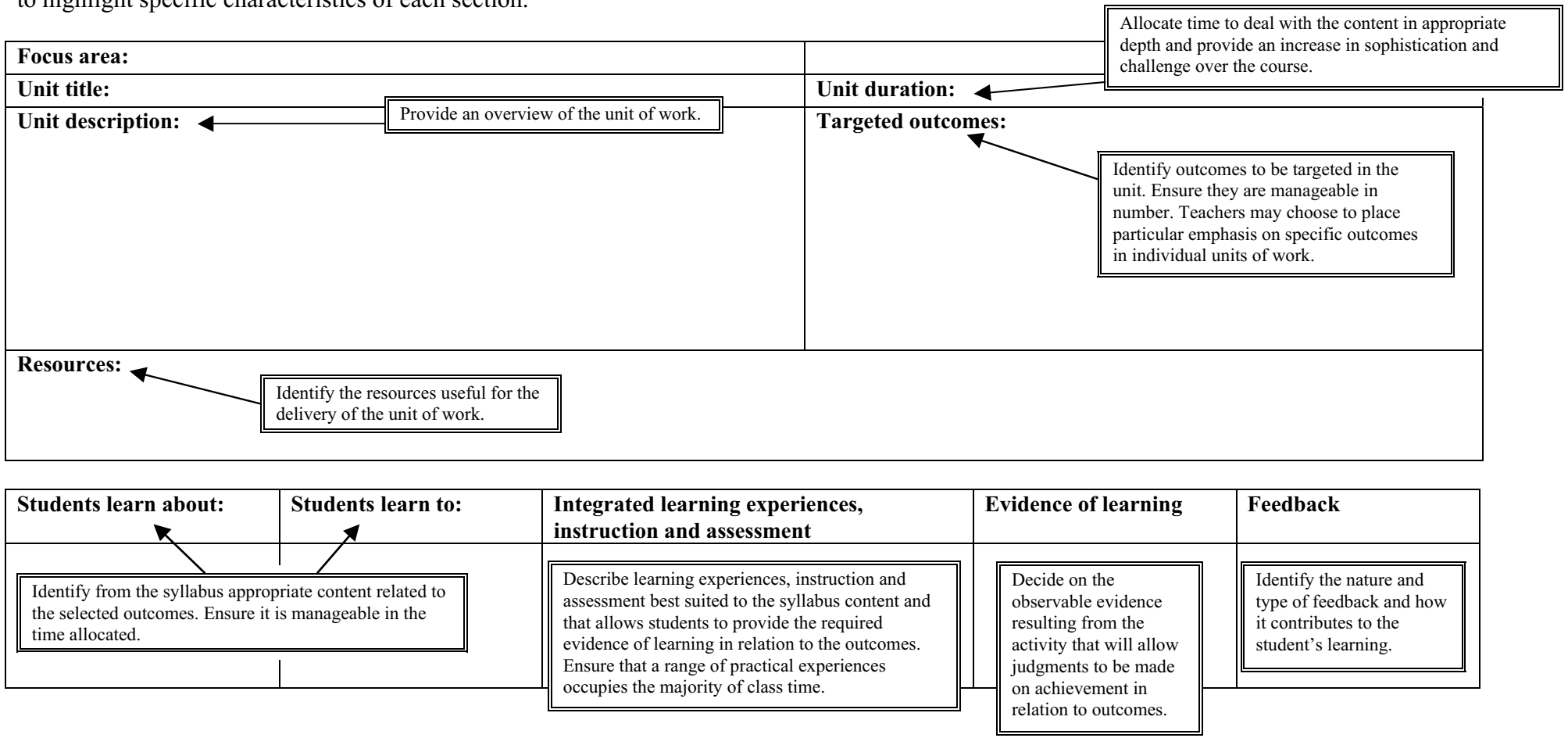
4 Programming Units of Work

The sample units of work have been developed using the following process:

1 identify the outcomes that will be addressed in the unit
2 decide on the focus of the unit of work
3 decide on the evidence of learning that will be required, how students will demonstrate learning in relation to the outcomes and how this evidence will be gathered and recorded
4 select the relevant syllabus content for the identified outcomes relating to the knowledge, understanding and skills that students will develop
5 plan the learning experiences and instruction, and identify the *assessment for learning* strategies that will provide the evidence of learning, checking that:
   - a range of assessment strategies is used
   - meaningful feedback in a variety of forms can be given to students
   - opportunities are provided to reflect on student progress and modify future learning experiences accordingly.

4.1 Sample Unit Proformas

Teachers can design a unit proforma that best meets their specific needs and circumstances. The sample unit proforma provided below has been annotated to highlight specific characteristics of each section.



5 Sample Units of Work

The sample units of work that follow are designed to assist teachers in planning for the implementation of the *Graphics Technology Years 7–10 Syllabus*. The units provide programming ideas for selected syllabus content.

The sample units show ways in which teachers can meet the needs, interests and abilities of their students, while assessing their progress towards a demonstration of outcomes. The sample units also illustrate ways in which assessment activities may be integrated into the teaching and learning sequence. They will assist teachers to understand the importance of:

- being explicit about the outcomes and content they are addressing
- being explicit about the evidence required to demonstrate student learning
- providing meaningful feedback to students
- adapting teaching and learning programs to students' demonstrated needs
- having a sound basis for modifying future teaching and learning programs (in light of students' demonstrated needs).

The sample units provide opportunities for students to engage in questioning and dialogue, self-assessment, peer assessment and reflection. Through these activities students can become clear about their own learning, understanding and needs.

Note that the assessment activities are described here in some detail to illustrate the process of *assessment for learning*. Teachers would not provide this level of detail in day-to-day classroom situations.

5.1 Stage 5 Sample Unit of Work: Core Module 1 – Children's Toys

<table>
<tr><td>Unit 3: Children's Toys</td><td>Unit duration: 7 weeks</td></tr>
<tr><td>Unit description:

This seven-week unit is placed at the end of core module 1. It introduces students to colour rendering techniques as well as 3D manipulation of basic solids on paper and in digital form. Shadow, tone and connectivity of solids are paramount in the learning activities. Prior to this unit students have spent time developing basic pictorial drawing skills. They have had an introduction to oblique drawing, and have had opportunities to practise and develop skills in this type of drawing. The unit incorporates skill development activities and provides opportunities for students to experiment with and practice rendering techniques.

The unit culminates in the production of a folio presentation to market a concept for a pull-along toy to a prospective manufacturer. The folio will incorporate a series of oblique drawings and may be presented either on paper or in a digital format.</td><td>Targeted outcomes
A student:
5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques
5.2.1 designs and produces a range of graphical presentations
5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes
5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.3.2 manages the development of graphical presentations to meet project briefs and specifications
5.4.1 manipulates and produces images using computer-based drafting and presentation technologies
5.5.2 demonstrates responsible and safe work practices for self and others
5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings</td></tr>
<tr><td colspan="2">Resources:
Drawing boards, OHP, coloured pencils, coloured Pantone (Yoken) markers optional, drawing instruments, CAD program 3D capability;
Kemnitzer, Ronald B, 1983, Rendering with Markers, Watson-Guptill Publications, New York.</td></tr>
</table>

Students learn about:	Students learn to:	Integrated learning experiences, instruction and assessment	Evidence of learning	Feedback
Graphics Principles and Techniques *Work Practices* • equipment – type and care • the importance of – selection and maintenance of equipment – clean and ordered work practices **Presentation** *Rendering* • shading, shadows, tone, texture • representation and colour	• use and maintain appropriate drafting equipment • apply planned and ordered approaches to producing drawings • use manual and/or computer-based rendering techniques in a variety of 2D and 3D drawings	• Students are instructed in and practise the correct use and storage of markers and related drawing equipment. • Teacher leads instruction and demonstration of layout of colour, shadow, tone etc. • **Students undertake a series of simple exercises to develop their skills in rendering oblique objects. These include cubes, rectangular prisms, cylinders and spheres in varying orientations.** ***(Sample assessment for learning activity, page 29)***	• Students demonstrate correct use and storage of equipment. • Student work is presented in a clean and ordered manner. • Student work reflects an understanding of and competence in the application of rendering techniques.	• teacher observation, oral feedback and correction of incorrect work practices • teacher annotations on worksheets relating to presentation • informal self and peer assessment of individual worksheets • oral feedback and/or teacher annotations on application of rendering techniques

Students learn about:	Students learn to:	Integrated learning experiences, instruction and assessment	Evidence of learning	Feedback
Graphics Principles and Techniques *Computing Principles* • CAD application set-up • the CAD environment including – tools – methods and modes – constraints and modifiers	• configure drafting applications • analyse and break down CAD drawing techniques into three general steps – tools – tool methods/modes – constraints/ modifiers	• Teacher introduces CAD software and demonstrates general navigation within the application. • Students explore the functions and tools of the application. • Class discusses functions and tools. Teacher elaborates on and refines student input. • Students complete elementary exercises in drawing two and three-dimensional shapes.	• Students correctly describe the tools and functions of the application.	• oral feedback from peers and teacher with clarification and expansion of key points
	• use basic CAD concepts including 2D/3D coordinate geometry, scale and measurement to carry out basic drafting construction • manipulate objects in relation to size, placement and orientation	• Students complete an oblique drawing in CAD using two cubes and a cylinder manipulated and aligned to a common axis.	• Students display confidence and competence in the use of the application. • Student work reflects an understanding and application of graphic techniques and software use.	• teacher observation and oral feedback on student knowledge and use of tools and processes • teacher annotations and oral feedback on application of techniques in completed drawings
• output options including printers, file formats, magnetic/optical media and computer-based communication media	• output information to a specified device or medium	• Students save work to a floppy disk and output to printer.	• Students successfully output information to disk and printer.	• teacher observation and oral feedback of student application of correct procedures

Students learn about:	Students learn to:	Integrated learning experiences, instruction and assessment	Evidence of learning	Feedback
Planning and Construction *Pictorial Drawing* • oblique drawing • isometric drawing	• produce pictorial drawings using CAD techniques	• Students complete an oblique drawing in CAD using two cubes and a cylinder manipulated and aligned to a common axis.	• Student work reflects an understanding and application of graphic techniques and software use.	• teacher annotations and oral feedback on application of techniques in completed drawings
Design in Graphics • design principles and processes	• identify design principles and processes in the development, production and evaluation of graphical presentations	• Students design and produce a graphical presentation for a pull-along toy which is suitable for marketing the concept to a manufacturer.	• Student presentation reflects an understanding and application of design principles and practices including layout, colour, selection and use of presentation techniques.	• teacher to assess presentation as part of a final folio presentation • teacher annotations and mark
Presentation *Rendering* • shading, shadows, tone, texture representation and colour • computer modelling and computer-based graphics	• use manual and/or computer-based rendering techniques in a variety of 2D and 3D drawings	• Teacher presents a number of samples of product drawings. • Class analyses the overall purpose of the samples and techniques employed and the overall effectiveness of samples. • Teacher highlights specific features and presentation techniques for the marketing of design concepts.	• Student work reflects an understanding and application of shade, shadow, texture and colour.	• oral feedback during production • written annotation and marking of final presentation • oral feedback during production

Students learn about:	**Students learn to:**	**Integrated learning experiences, instruction and assessment**	**Evidence of learning**	**Feedback**
Product Drawing • drawing to convey product concept • use of CAD to generate final drawings *Techniques* • manual presentation methods	• identify and produce types of drawings used in marketing • present product information in a clear and innovative manner	• Students produce a graphical presentation to market a pull-along toy to a prospective manufacturer. • Presentation includes: – sketches to illustrate the development of ideas leading to the final concept – oblique drawings of individual components – a rendered oblique drawing of the assembled components – drawings and sketches to be generated and presented using both manual and – computer-based techniques.	• Students successfully use computer-based graphics as part of the final presentation. • Students produce quality drawings that clearly communicate product concept. • Students competently use CAD to produce drawings as part of final presentation. • Students competently select and use appropriate drawings.	• written annotation and marking of final presentation • oral feedback during production • written annotation and marking of final presentation • oral feedback during production • written annotation and marking of final presentation • oral feedback during production • written annotation and marking of final presentation

5.1.1 Sample assessment for learning activity: Elementary Rendering

Context
Students are undertaking a unit of work to introduce them to the principles and concepts of product illustration. Prior to this they have undertaken preliminary work developing knowledge and skills in pictorial drawing with an emphasis on oblique projection. This activity is placed at the beginning of the unit and introduces students to elementary rendering concepts and techniques, in particular the use of tonal scales and shadow.

Outcomes
A student:
5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques
5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings.

Description of activity
Using the worksheet supplied, students lead render oblique blocks in varying orientations. Consideration is given to the positioning of the light source and tonal scales of individual faces. They also project and render the shadow cast by the block.

Criteria for assessing learning
(These criteria would normally be communicated to students with the activity.)

Students will be assessed on their ability to:
- apply tonal scale rendering to solid shapes
- project a shadow from a solid shape
- observe and apply graphics standards, conventions and procedures in relation to line-work and shading.

Guidelines for marking
The following guidelines for marking show one approach to assigning a value to a student's work. Other approaches may be used that better suit the reporting process of the school. Categories, marks, grades, visual representations or individual comments/notations may all be useful.

Range	A student in this range:
8–10 (High)	• applies tonal scales to surfaces consistent with light source • accurately projects shadow • demonstrates a high degree of accuracy in line-work, shading and presentation
5–7 (Satisfactory)	• applies tonal scales to some surfaces with a recognition of light source • projects a shadow consistent with light source • line-work, shading and presentation completed to a satisfactory standard
1–4 (Progressing)	• applies shading to some surfaces, not necessarily consistent with light source • projects a shadow inconsistent with light source • line-work, shading and presentation require further development.

Feedback

While undertaking this activity, students will be provided with regular and ongoing feedback. This may include individual instruction and demonstration of specific techniques. Completed worksheets will be assessed by the teacher. Written annotations will inform students on areas of success and areas for improvement. Comments will inform them about such things as:

- the application of tonal scales to individual surfaces
- the recognition of light source
- overall presentation.

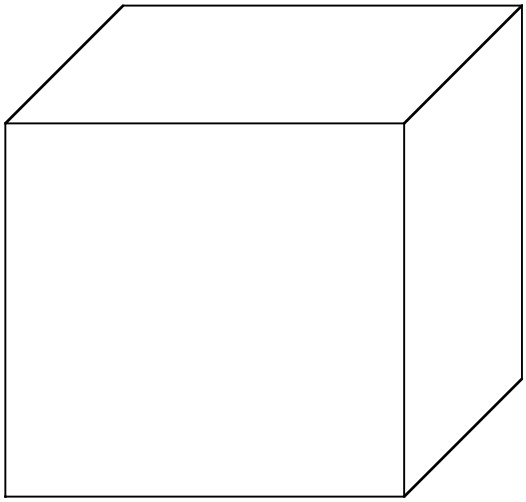
Students will be encouraged to reflect on the feedback provided on this activity before undertaking subsequent rendering activities.

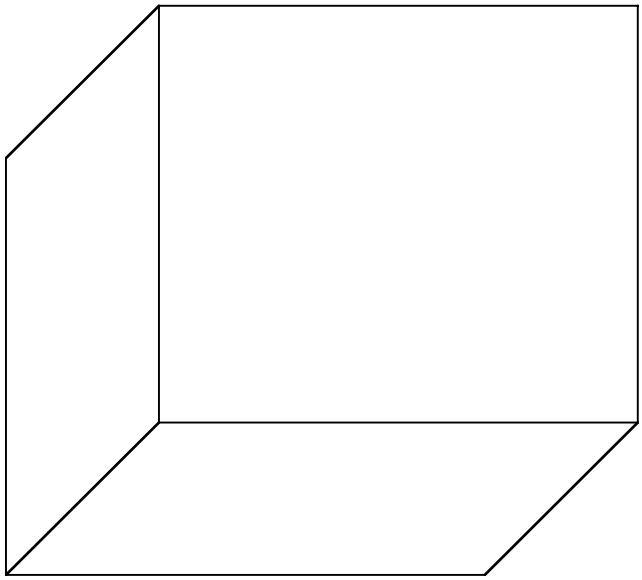
Future directions

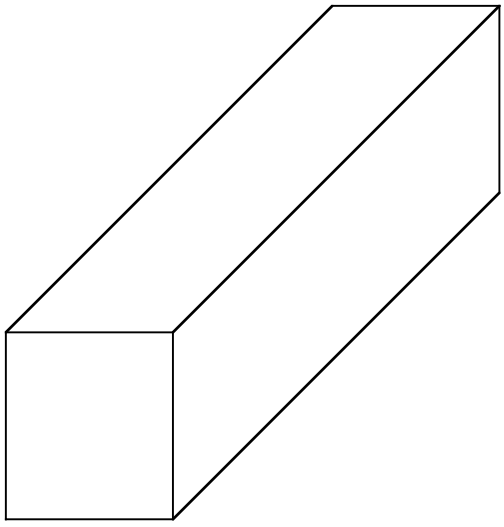
This activity develops knowledge and skills which will be further developed and applied throughout the unit, culminating in the development of presentation drawings of a pull-along toy. Evidence collected through this activity could serve to inform teachers about the students' readiness to move on to more complex tasks or could identify the need for supplementary activities to provide students with opportunities for the mastery of skills.

Assessment of the final presentation drawings will incorporate the assessment of rendering techniques and skills.

Sample student worksheet: Elementary Rendering







Tonal Scales:	Shadow:	Presentation:

5.2 Stage 5 Sample Unit of Work: Core Module 2 – Household Appliances

Unit 4: Household Appliances	**Unit duration: 7 weeks**
Unit description: This unit is placed at the beginning of core module 2. It introduces students to the concepts of orthogonal drawing while consolidating knowledge of, and skills in, pictorial drawing and rendering developed in previous units. Students also deepen their knowledge and understanding of drafting standards (AS 1100) through the introduction of dimensioning standards and techniques. Throughout the unit students gain knowledge and experience in the use of both manual and computer-based drafting technologies. The unit culminates in the production of a graphical presentation based on a common household appliance (eg toaster).	**Targeted outcomes** A student: 5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques 5.2.1 designs and produces a range of graphical presentations 5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications 54.1 manipulates and produces images using computer-based drafting and presentation technologies 5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings
Resources: Technical drawing and graphics textbooks, manual drafting equipment, CAD program (ProDesktop), rendering pastels and markers.	

Students learn about:	Students learn to:	Integrated learning experiences, instruction and assessment	Evidence of learning	Feedback
Design in Graphics				
• design principles and processes	• apply design principles and processes in the development, production and evaluation of graphical presentations	• Class analyses the design features of a common household appliance, eg toaster. • In pairs students analyse design features of toaster. Issues could include bread size, other purposes (muffins), bench space, aesthetics, electrical safety, cleaning. • Groups present results to class.	• Students are able to identify and assess the main design features of the toaster.	• oral feedback and consolidation of discussion points
• freehand design drawings	• apply different graphical representations in elementary design situations	• Students revise isometric sketching, with emphasis on shape and proportion. • Using isometric grid paper, students produce design sketches of four different toaster designs.	• Sketches reflect understanding of isometric projection and freehand sketching skills.	• oral feedback and annotations on quality and accuracy of sketches
Planning and Construction				
Pictorial Drawing				
• a variety of pictorial presentation techniques including – isometric and oblique – planometric/ axonometric	• visualise and draft common objects • construct pictorial circles and geometric shapes • utilise a range of pictorial representations	• Students are given an introduction and demonstration of techniques for drafting pictorial circles and curves. • Students undertake a series of practice exercises in drafting circles and curves. • Students produce pictorial drawings of common household appliances.	• Students can successfully incorporate circles and curves into pictorial drawings.	• oral feedback and annotations on completed drawings including comments regarding construction techniques for circles and other shapes

Students learn about:	**Students learn to:**	**Integrated learning experiences, instruction and assessment**	**Evidence of learning**	**Feedback**
• generation of graphic shapes in the CAD environment to create realistic 3D images	• create 3D images using the principles of extrusion and revolution • manipulate 3D objects in relation to size, placement and orientation	• Students revise CAD, tools and functions including extrusion, subtract extrusion, attachment of objects. • Students produce an isometric drawing of the final toaster design using a suitable CAD package (eg ProDesktop).	• Students display confidence and competence in the use of CAD.	• teacher observation and oral feedback • annotations and final assessment of completed drawings
Presentation *Pictorial Rendering*				
• rendering pictorial drawings to assist others in the visualisation of a product or concept • 3D modelling and rendering	• apply manual rendering and/or modelling techniques to a range of products • model and render a simple product in 3D using CAD or appropriate graphics software	• Students discuss likely materials for manufacture of the toaster. • Students revise manual rendering techniques to illustrate material and texture. • Students apply manual rendering techniques to complete graphic.	• Students demonstrate an understanding of and skills in the use of manual rendering techniques.	• teacher observation and oral feedback • annotations and final assessment of rendered drawings
Design in Graphics				
• research sources, eg internet, journals, magazines, digital media, libraries and personal interviews	• use a range of sources to gather information to assist in the development of project work	• Students investigate a selected household appliance to determine – how it works – materials used in its manufacture – traditional and contemporary styles.	• Students can locate and source accurate and relevant information.	• oral feedback and direction during research • annotations on information quality in assessment of presentation

Students learn about:	**Students learn to:**	**Integrated learning experiences, instruction and assessment**	**Evidence of learning**	**Feedback**
Presentation *Techniques* • multimedia and traditional presentation methods	• apply both traditional and multimedia techniques to present products graphically	• Students are introduced to presentation software package (eg Microsoft Powerpoint). • Class discussion and informal questioning determine students' prior knowledge and experience. • **Students design and produce a Powerpoint presentation based on research into appliances and incorporating sketches/drawings of their own design concept.** ***(Sample assessment for learning activity, page 36)***	• Students are able to design and produce an informative multimedia presentation.	• peer and teacher assessment of individual presentations with oral and written feedback

5.2.1 Sample assessment for learning activity: Multimedia Presentation

Context
Students are undertaking the second module of the Graphics Technology course. Having previously completed module 1 the students have prior knowledge of orthogonal and pictorial drawing.

The current unit of work follows the theme of household appliances, with a focus on toasters. Students have just completed research into the history, operation and materials used in the design and manufacture of toasters. This activity will allow further development of sketching skills and reinforce the principles of isometric drawing.

The activity occurs in the early part of the unit. Approximately 4×40 minute periods have been assigned to complete the activity, with a further 2×40 minute periods for student presentations.

Outcomes
A student:
5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations
5.2.1 designs and produces a range of graphical presentations
5.4.2 designs, produces and evaluates multimedia presentations.

Description of activity
Students design and produce a Powerpoint presentation that outlines the operation of a toaster and the materials commonly used in the manufacture of toasters. The presentation also needs to incorporate concept sketches for the design of a new toaster. Students present the completed work to the class.

Criteria for assessing learning
(These criteria would normally be communicated to students with the activity.)

Students will be assessed on their ability to:
- design and produce a multimedia presentation for a specific audience
- select and present accurate information in a clear and concise manner
- produce quality freehand concept sketches.

Guidelines for marking

The following guidelines for marking show one approach to assigning a value to a student's work. Other approaches may be used that better suit the reporting process of the school. Categories, marks, grades, visual representations or individual comments/notations may all be useful.

Range	A student in this range:
11–15 (High)	• displays high technical skill in the design and production of multimedia presentations • selects and presents information in a clear and concise manner reflecting a consideration of the audience • produces high quality detailed freehand sketches and successfully integrates these into the overall presentation
6–10 (Satisfactory)	• displays competence in the selection and use of the elementary features of a multimedia application in the design and production of the presentation • presents information with some consideration of audience • produces clear and accurate freehand sketches which are incorporated into the final presentation
1–5 (Progressing)	• displays limited technical skill in producing a simple multimedia presentation • collects and presents information related to the topic • displays limited skill in the production of freehand sketches.

Feedback

While undertaking this activity students will receive regular feedback. This may include individual instruction or demonstration of specific techniques and processes that will inform the development and production of the presentation.

The completed presentation will be assessed through peer and teacher evaluation with feedback provided orally and through written annotations. Teacher comments will inform students about such things as their selection and presentation of content, presentation sequencing, and timing and freehand sketching technique.

Future directions

This activity links to future learning within the unit of work where students will produce a range of presentations based on the toaster. The development of skills in multimedia presentation techniques serves as preparation for work to be undertaken later in the course involving the design and development of individual graphical presentations. The knowledge of materials gained through this activity will be further developed in the Engineering Drawing option module to be undertaken in Year 10.

5.3 Stage 5 Sample Unit of Work: Option Module – Engineering Drawing

<table>
<tr><td>A Thematic Approach – Clamping Devices</td><td>Unit duration: 10 weeks</td></tr>
<tr><td>Unit description:

This unit is placed in the second 100 hours of a 200-hour course. The theme for the unit is Clamping Devices. Through this unit students are introduced to concepts related to:
• planning and sketching drawing layouts
• representation of engineering elements
• detail drawings
• assembly drawings.

This unit consolidates and extends knowledge and understanding of, and skills in, graphics technology with a particular emphasis on the standards and presentation methods used in engineering. The unit incorporates skill development activities related to the production of detail and assembly drawings.</td><td>Targeted outcomes
A student:
5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques
5.2.1 designs and produces a range of graphical presentations
5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.3.2 manages the development of graphical presentations to meet project briefs and specifications
5.4.1 manipulates and produces images using computer-based drafting and presentation technologies
5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment
5.5.2 demonstrates responsible and safe work practices for self and others
5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings</td></tr>
<tr><td colspan="2">Resources:
School metalwork workshop, a variety of clamping and holding devices, manual drafting equipment, suitable CAD program.</td></tr>
</table>

Students learn about:	Students learn to:	Integrated learning experiences, instruction and assessment	Evidence of learning	Feedback
Graphics Principles and Techniques				
• engineering materials	• name common materials used in engineering applications	• Class analyses and discusses a range of holding devices and the materials used in their manufacture. • Students predict the properties that would be essential in the materials used in the manufacture of these devices.	• Students can recall a range of holding devices and describe basic properties of the materials used in their manufacture.	• oral feedback and clarification and/or elaboration of key points
• conventional representation of features and parts	• consolidate and apply the standard representation of engineering elements	• Students analyse each holding device for the common engineering elements incorporated into their design, eg screw threads. • Teacher supplies handout with a number of engineering elements identified and the standard representation of these elements. • Students see demonstration and receive instruction in the representation of engineering elements: – screw threads – nuts and bolts – knurling etc.	• Students can recognise standard representations of engineering elements in existing drawings.	• observation and oral feedback
		• Students complete a series of exercises incorporating representation of these elements.	• Students can accurately and correctly represent engineering elements.	• annotations on student work on representation of elements

Students learn about:	**Students learn to:**	**Integrated learning experiences, instruction and assessment**	**Evidence of learning**	**Feedback**
Design in Graphics • freehand engineering design drawings	• take measurements from an existing component and represent engineering detail through dimensioned sketches	• Teacher provides a variety of components from holding devices (may vary from simple to complex to cater for individual student abilities). • Students select a component and produce a dimensioned orthogonal sketch.	• Students are able to produce comprehensive and accurate sketches of selected items.	• observation and oral feedback on quality and accuracy of sketches
	• use sketches in planning drawing layouts, component assemblies and design situations	• Throughout the unit students will undertake the production of a number of engineering drawings. In all instances students will plan drawing layouts through freehand sketches before the preparation of formal drawings.	• Formal drawings will reflect a consideration of layout through the placement of views and components.	• teacher observation and oral feedback on sketches and proposed drawing layouts
Planning and Construction • detail drawings	• apply engineering drawing standards to a range of components • produce drawings incorporating a variety of engineering features • use an appropriate level of dimensioning to fully describe a component	• Students undertake a series of drawings of holding and clamping devices. For each device identified students will produce detail drawings of individual components. • Drawings for completion are: – G-cramp – **vee block and clamp** ***(Sample assessment for learning activity, page 42)*** – jewellers vice.	• Students demonstrate understanding and competence in the development and production of item drawings including the representation of engineering features and elements.	• teacher observation and oral feedback during the production of drawings • annotation and marking of completed drawings

Students learn about:	**Students learn to:**	**Integrated learning experiences, instruction and assessment**	**Evidence of learning**	**Feedback**
• assembly drawings	• produce fully itemised assembly drawings incorporating a parts list • represent engineering features and parts of assembled components • apply sectioning techniques to assembly drawings	• Students revise assembly drawings, alignment of components, item numbers, parts lists etc. • Students revise sectioning (full and half), representation of sectional views, section planes. • Students produce itemised assembly drawings incorporating sectional views: – G-cramp – **vee block and clamp** ***(Sample assessment for learning activity, page 42)*** – jewellers vice.	• Students demonstrate understanding and competence in the development and production of assembly drawings including the representation of engineering features and elements and sectional views.	• teacher observation and oral feedback during the production of drawings • annotation and marking of completed drawings
• application of CAD software in the development of engineering drawings	• use CAD software to create engineering detail and assembly drawings	• Teacher demonstrates features of CAD relating to representation of engineering elements and features and sectional views. • Students select a holding or clamping device from the school workshop. • Students produce item and assembly drawings of a selected holding or clamping device using a suitable CAD package.	• Students demonstrate confidence and competence in the use of CAD to produce engineering drawings.	• teacher observation and oral feedback during production of drawings • annotation and marking of completed drawings

5.3.1 Sample assessment for learning activity: Item and Assembly Drawings

Context
Students are undertaking the study of the Engineering Drawing option module. This activity, which takes place midway through the unit, has a focus on holding and clamping devices commonly found in school workshops. Students have had prior instruction and experience in the development and production of detail and assembly drawings including the representation of common engineering elements such as screw threads.

Outcomes
A student:
5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques
5.2.1 designs and produces a range of graphical presentations
5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings.

Description of activity
Working from a supplied exploded pictorial view of a vee block and clamp, students produce detailed item drawings of each individual component and an itemised assembly drawing incorporating a fully sectioned front view.

Criteria for assessing learning
(These criteria would normally be communicated to students with the activity.)

Students will be assessed on their ability to:
- produce engineering drawings from a pictorial view
- apply engineering drawing standards related to:
  - general drafting procedures; line-work, page layout, etc
  - dimensioning
  - representation of engineering features and elements: threads, knurls
  - sectional views
  - itemisation and parts lists.

Guidelines for marking

The following guidelines for marking show one approach to assigning a value to a student's work. Other approaches may be used that better suit the reporting process of the school. Categories, marks, grades, visual representations or individual comments/notations may all be useful.

Range	A student in this range:
11–15 (High)	• produces detailed and accurate representation of individual components and assembly • demonstrates correct application of engineering drawing standards
6–10 (Satisfactory)	• demonstrates correct representation of individual components and assembly • represents some engineering features and elements using engineering standards • completes drawings with some accuracy and detail
1–5 (Progressing)	• represents individual components and assembly to give overall description with some inaccuracies • inconsistently applies engineering drawing standards • completes sketches and/or drawings with limited accuracy.

Feedback

While undertaking this activity students will receive regular feedback, including demonstration of specific techniques and explanation of concepts. Final assessment of the drawings will incorporate written annotations. Comments will inform them about such things as their application of engineering drawing standards, interpretation and representation of principal and sectional views and overall presentation standards.

Future directions

This activity provides the opportunity to develop knowledge and skills that will be built on and enhanced through subsequent activities within the unit of work, including the development and production of more complex engineering drawings.