

Stage 6

Industrial Technology syllabus support

Participant workbook



Curriculum
K-12



Acknowledgements

The Technology Unit of the Curriculum K–12 Directorate has developed professional learning workshops for secondary technology teachers in NSW public schools to provide practical strategies and resources to support teachers of Industrial Technology.

Materials developed by:

Mark Tyler	Head Teacher Industrial Arts, Pennant Hills High School
Lyndall Foster	Technology Unit, Curriculum K–12 Directorate
Julie King	Technology Unit, Curriculum K–12 Directorate
Dan Rytmeister	Head Teacher Industrial Arts, Marrickville High School

The following people contributed to the consultation and development process of these materials:

Theo Docos	Matraville Sports High School
Richard Doel-Mackaway	Centre for Learning Innovation
Tim Gorrod	Centre for Learning Innovation
Marisa Johnston	Fairfield High School
Ian McKenzie	Greystanes High School
David Macpherson	Hoxton Park High School
Astrid Perdriau	St Ives High School
John Reardon	Cheltenham Girls High School
David Smith	Bateman's Bay High School
Peter Thompson	Bossley Park High School
Greg Wright	Epping Boys' High School

For more information contact:

Julie King

R/Manager Technology

julie.king@det.nsw.edu.au

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Aims of the workshop

The aims of the workshop are to assist teachers to:

- become familiar with the amended Stage 6 Industrial Technology syllabus
- develop programming and assessment that reflects the *NSW Quality Teaching model*
- utilise teaching strategies to improve student learning outcomes
- become familiar with the Board of Studies marking guidelines for Stage 6 Industrial Technology and the practical marking process.

Ultimately, all we do must be to improve student outcomes.

NSWIT course registration

The DET is a NSW Institute of Teachers endorsed provider of professional development for the maintenance of accreditation at Professional Competence.

Scope of endorsement – all Elements of the Professional Teaching Standards.

It is anticipated this course will address the following Professional Teaching Standards:

- 1.2.1 Apply and use knowledge of the content/discipline(s) through effective, content-rich, teaching activities and programs relevant to the stage.
- 2.2.3 Apply practical and theoretical knowledge and understanding of the different approaches to learning to enhance student outcomes.
- 6.2.4 Work productively and openly with colleagues in reviewing teaching strategies and refining professional knowledge and practice.

This DET course or program has been submitted to the NSW Institute of Teachers.

If the course is accredited, its completion will contribute **five** hours towards Institute Registered professional development.

Stage 6 Industrial Technology syllabus support workshop agenda

TIME	SESSION FOCUS
9.00 am	Welcome and workshop overview
Session 1 9.10 am	Syllabus changes Overview of changes to the syllabus and the support document.
	Activity 1a – Electronic Content Allocation Tool (ECAT) Explore the features, functions and applications of the Electronic Content Allocation Tool. Practice using the tool on a programmed unit of work.
	Activity 1b – Environmental and sociological issues Become familiar with a teaching strategy that helps students to consider and articulate viewpoints.
	Resources to support teaching and learning programs Overview of available resources including BOS, DET and CLI.
11.00 am	MORNING TEA
Session 2 11.20 am	Activity 2a – Analysing results and using data Reviewing results using data from the DET and BOS.
	Activity 2b – Scope and sequence for assessment tasks Develop a schedule to map assessment requirements for the course.
	Activity 2c – Reciprocal teaching strategy Become familiar with a teaching strategy that can help students to comprehend and respond to an article that uses complex language.
1.00 pm	LUNCH
Session 3 1.40 pm	Activity 3a – A marker's perspective Gain familiarity with the processes used to mark the written paper. Use the marking guidelines to gain an insight into practical marking.
	Activity 3b – Quality practical work Simulated marking and tips for each focus area to assist students to select appropriate projects and ensure quality projects.
3.20 pm	Evaluation and Close

Session 1

Activity 1a – Electronic Content Allocation Tool

The purpose of this activity is to:

- explore the features, functions and applications of the Electronic Content Allocation Tool (ECAT)
 - practice using the tool on a unit of work.
1. Observe the demonstration of the use of ECAT.
 2. In groups of two or three, use the Electronic Content Allocation Tool (ECAT) supplied on your USB to map syllabus content from the supplied unit of work on page 11 of the *Resource book*. This resource is from the course plan for Timber Products and Furniture Technologies (Preliminary).
- ECAT is available for download from Curriculum Support's web site http://www.curriculumsupport.education.nsw.gov.au/secondary/technology/11_12/industrial/index.htm along with instructions for its use.
3. Full instructions for use of the ECAT are found on page 7 of the *Resource book*.

Activity 1b – Environmental and sociological issues

The purpose of this activity is to become familiar with a teaching strategy that helps students to consider and articulate viewpoints on social and environmental issues.

Environmental and sociological issues are given emphasis in many parts of the Preliminary and HSC syllabuses. For example, these *Learn tos* and *Learn abouts* come from the *Environmental and Sociological Considerations* within the *Industry Study*.

Students learn about:	Students learn to:
Environmental and sociological considerations - alternative resources: - power - material - processes - limitations - recycling and reusing - waste management and minimisation - pollution - sustainable development - rehabilitation of commercial sites - legislative requirements: - local - state - federal - environmental studies - location: - land costs and availability - transportation facilities - workforce - impact on surrounding population - resource availability - geographical factors - waste management	- describe and evaluate the approaches to the various environmental and sociological factors adopted by the industry studied - recognise and evaluate alternatives to traditional industrial practice especially in relation to power and resource management - discuss and justify the ramifications of legislative requirements on the development and sustainability of the industry - identify and describe how factors relating to location affect the viability and organisation of industry

1. Working in pairs, read through the handout article *Environment safe and good for jobs* by Julian Amos and Jim Adams.
2. From what you know about pulp mills, select two issues each and take one minute to write a positive or negative impact on each of the issues. Each person in the group should write about two different issues.
3. In your group, collate the information from your partner into your workbook.

Collate the information into this table.

Issue	Impact	Positive or negative
Alternative resources e.g. processes		
Waste management and minimisation		
Pollution		
Legislative requirements		

4. Share the information collected with the whole group.
5. Write a question you could pose to assess students' comprehension of the passage.

Note: A copy of the article *Serious threat to forests and future* by Don Henry has been provided as an additional resource. It presents an opposing view to the establishment of pulp mills.

Resources to support teaching and learning programs

The purpose of this activity is to:

- become aware of a range of resources to support teaching the core and specific to the focus areas
- explore some electronic resources produced by the Centre for Learning Innovation (CLI).

Curriculum Support website. See page 17 of the *Resource book*.

Board of Studies website. See page 18 of the *Resource book*.

Tale website. See page 19 of the *Resource book*.

HSC Online website. See page 22 of the *Resource book*.

Australian Flexible Learning Framework website. See page 23 of the *Resource book*.

Other resources

Centre for Learning Innovation (CLI) produces a range of electronic resources. These are all free to download via the Tale website.

- How to use Tale to search for TAS resources:
- Go to <http://www.tale.edu.au>
- Click on *Secondary*
- In the search box click on *Show advanced options*
- Change the following search settings:
 - Learning areas: Technology (secondary)
 - Stages: Stage 4, Stage 5, Stage 6
 - Featured collections: Centre for Learning Innovation
- Click on the *Search* button.

There are also some useful resources within *Featured collections* within the search function, search under *The Le@rning Federation* and *Curriculum Support*.

The resources Digital Media and Tensile Testing are being finalised and will soon be uploaded to the Tale website.

The Institute of Industrial Arts and Technology Education (IIATE) produces a newsletter in CD form with resources for all subjects including Stage 6 Industrial Technology. Refer to page 24 of the *Resource book* for a list of some relevant resources.

Esnet is an email discussion list that focuses upon matters of interest to industrial arts teachers, primarily. Matters of equipment, technology and resources are frequently discussed. Refer to page 25 of the *Resource book*.

Session 2

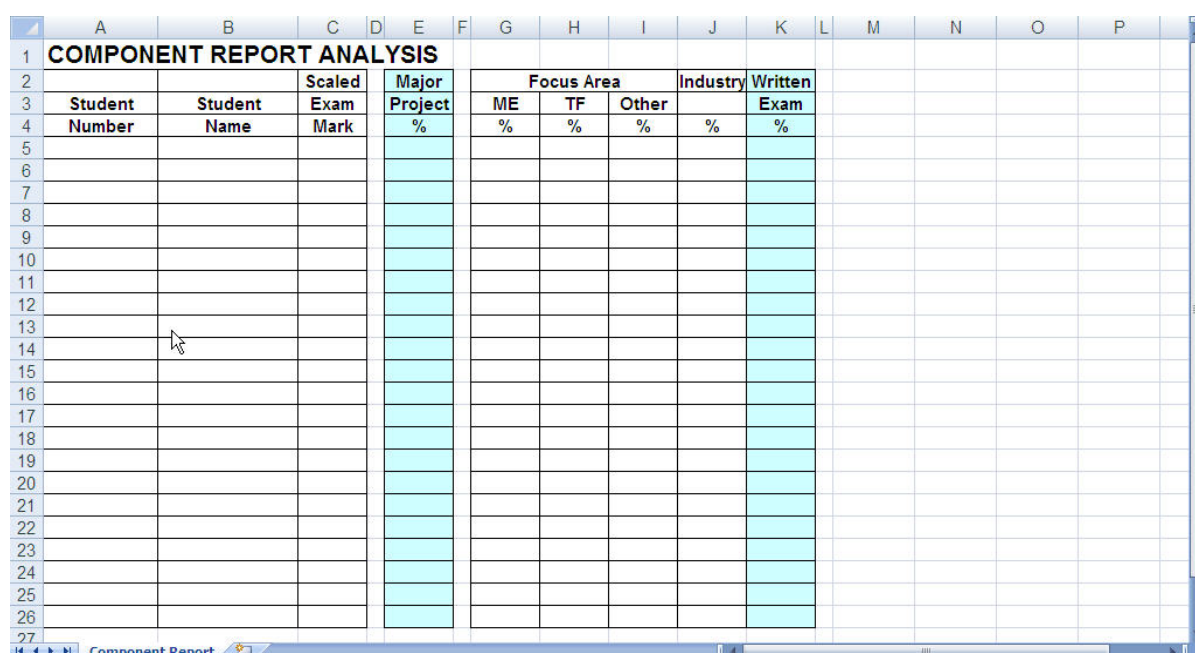
Activity 2a – Analysing results and using data

The purpose of this activity is to:

- become familiar with the Components Report provided to schools by the BOS
 - use data to analyse HSC results.
1. Working in groups of two or three, refer to the *HSC Components Report* provided on page 25 of the *Resource book*.
 2. The data from the HSC Components Report has been copied into the sample Excel worksheet named *Technology High* on page 27 of the *Resource book*.
 3. Look at the data and select three students who have performed almost equally well in both the written and practical examinations.
 4. Look at the data and select an example of a student who has outperformed in either the written examination or in the practical examination.
 5. Discuss with your partner/group reasons why this might have happened. Record below.
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6. Refer to the worksheet titled *Industrial High* on page 28 of the *Resource book*.
 7. Look at the data and discuss with your partner/group any trends evident in the data.

Using the ‘*Components Report Blank*’ spreadsheet

- Open the spreadsheet ‘*Components Report*’ on the *USB* and save immediately with a different name.
- If necessary, adjust the zoom so you can see all columns.
- Enter student numbers or actual names in columns A and B.
- Enter exam marks from your school into column C.
- Enter the contribution to the exam mark from the *Major Project* into column E.
- Enter the contribution to the exam mark from the *Industry Focus Area* into column G, H or I. (Metals and Engineering – ME, Timber Products and Furniture – TF, or from one of the other four focus areas).
- Enter the contribution to the exam mark from the *Industry Study* section into column J.
- The spreadsheet will automatically add the percentages from the two sections of the written examination. This will appear in column K.



1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
2	COMPONENT REPORT ANALYSIS															
3	Student	Student	Scaled	Major			Focus Area			Industry	Written					
4	Number	Name	Mark	Project			ME	TF	Other		Exam					
5				%			%	%	%	%	%					
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Remember HSC results are confidential.

SMART Data

1. Working in groups of two or three, refer to the *School vs State - Within School Analysis* provided on page 29 of the *Resource book*.
2. This data is from the *Principals Results Analysis Package* and shows how students in Industrial Technology have performed between 2004 and 2008 compared to results in all other subjects across the school.
3. On page 30 the *ScatterPlot Analysis* shows how students in Industrial Technology performed in the 2008 HSC compared to their overall performance in the 2006 School Certificate. This is often referred to as a value-added analysis.
4. Refer to the *Smart Data* PowerPoint presentation.
5. Each student is represented by a circle. When viewing this data live, as the curser rolls over the circle, the name of that student is revealed.
6. Refer to the colour *ScatterPlot Analysis* handout which shows how students in an Industrial Technology class performed in the 2008 HSC compared to their performance in their other subjects. As before when viewing this data live, as the curser rolls over the circle, the name of that student and each subject is revealed.
7. For the purpose of this exercise the results for Industrial Technology have been coloured red manually.
8. Discuss with your partner or group the relative performance of this group.
9. With reference to the student marked in blue, what can you deduce from his/her results.
10. Discuss with your partner or group how this type of data might be useful.

Activity 2b – Scope and sequence of assessment tasks

The purpose of this activity is to:

- become familiar with changes to assessment weightings
- develop skills in planning assessment tasks.

Assessment weightings and tasks

1. Working individually or with a partner, refer to page 31 of the *Resource book* showing the *Assessment Weightings and Tasks* from the revised syllabus document.
2. Consider the components and weightings in the Preliminary course when compared to the handout – *Industrial Technology Stage 6 Support Document 1999*.
3. Discuss with your partner and record the implications of these changes below.

Assessment schedules

1. Working with a partner, compare the three sample schedules for the HSC course produced by teachers at three different schools.
2. Observe that each teacher has interpreted the syllabus document differently, allocating the HSC outcomes to different components of the syllabus.
3. The three schedules also differ in the number and types of tasks and the relative weightings. Discuss this with your partner and report back to the whole group.

The table below may assist with your discussions:

Components	Weighting %	Task 1	Task 2	Task 3	Task 4	Task 5
Industry Study	15					
Major Project	60					
Industry Related Manufacturing Technology	25					
Total	100					

4. Some sample assessment schedules are available on the Curriculum Support website: <http://www.curriculumsupport.education.nsw.gov.au/>
5. A copy of the blank assessment schedule is included on your *USB*.

Activity 2c – Reciprocal teaching strategy

The purpose of this activity is to:

- become familiar with a teaching strategy that can help students to comprehend and respond to an article that uses complex language
- enhance students' knowledge of a specific technology.

The reciprocal teaching strategy assists students to construct meaning from text and gives them a means of monitoring their reading to ensure they understand what they read. It consists of four stages:

- Predict
- Clarify
- Question
- Summarise.

1. Use the four stages to analyse the article, 'Better Lithium-ion Batteries' by Prachi Patel, *Resource book*, page 38. You should work in groups of two or three, as students would do. Each group should analyse one paragraph, writing answers in the table on the next page.

Predict – what do you think the paragraph is about?

2. **Clarify** – use a highlighter and mark the words, terms or phrases that you need to clarify. Use the *Glossary of terms* on page 40 of the *Resource book* to help with clarification. Write the outcomes of these clarifications in the table.
3. **Question** – ask your group members questions about the text.
4. **Summarise** – write a summary of the paragraph in the table. In class, you would then collect and collate the summaries to make a complete summarised article written in accessible language.
5. Discuss this strategy and make suggestions as to how it may be used in class.
6. Write a question you could pose to test your students' understanding of the passage.

Stages	Notes
Predict: note the title and try to predict what the text is about. This allows you to link new knowledge contained in the text with knowledge you already have.	
Clarify: use a highlighter to mark words, terms or phrases that are more difficult or technical. Use your group members (or other means) to help you with clarification.	
Question: ask your group members questions about the text, identifying information that is most important and relevant.	
Summarise: write 1, 2 or 3 sentences that summarise the text in your own words.	

Session 3

Activity 3a – A marker's perspective

The purpose of this activity is to:

- gain familiarity with the processes used to mark the written paper.
- learn how to apply Board of Studies marking guidelines to the major project and associated documentation.

Written paper marking process

1. The written marking operation is managed by the Supervisor of Marking supported by the Assistant Supervisor of Marking and Chairperson of the Exam Committee and a number of Senior Markers.
2. Each senior marker supervises a team of approximately 10 markers including a pilot marker, all of whom mark a single examination question, e.g. Section 1, Question 1. There may be more than one team that marks the same question.
3. The industry questions (1, 2 and 3) are marked across all focus areas by the same teams of markers.
4. The industry specific questions are marked according to the focus area i.e. Question 4 Multimedia, Question 4 Graphics, etc.
5. When the examination paper is written it includes a set of marking criteria which are used to guide the marking process.
6. Marking commences with the Senior Markers and Pilot Markers reviewing the marking criteria for their question, marking a sample of exam scripts to familiarise themselves with the criteria.
7. A number of exam scripts are selected and marked by the team of markers to ensure the marking criteria are applied consistently by all markers.
8. Markers commence marking written scripts, these are sample checked by the Pilot Marker and Senior Marker for accuracy. At regular intervals a control script is marked to ensure markers are not deviating from the marking criteria.

Major project marking process

1. The major project marking operation is managed by the Supervisor of Marking supported by the Assistant Supervisor of Marking and a number of Senior Markers.
2. The senior markers supervise approximately 50 markers working in pairs. Generally the first week of marking is spent in Sydney, Newcastle and Wollongong with the second week spent in regional areas.
3. Practical marking is a double marking exercise with each project being marked independently and the average mark given to the project.
4. Extensive briefings occur for all markers over three days immediately prior to practical marking. Pilot marking of projects from all focus areas ensures markers are consistent and this is supported by *benchmark* and *sample booklets* of projects.
5. Senior markers visit the markers three times during the first week to monitor the marking and visit again during the second week.
6. Markers use the HSC marking guidelines for the practical project available from:
http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/ind_tech_prac_markguide.pdf
7. These guidelines have been converted to a checklist used by the HSC markers that can be found on page 41 of the *Resource book*.

Applying the practical marking guidelines

1. Refer to *Using the Marking Guidelines* on page 42 of the *Resource book*. This lists the criteria for the *Selection and Justification* area of the *Marking Guidelines*.
2. Each table represents a different level of achievement and is used by the markers to determine the level of achievement in that section.
3. Refer to the *Selection and Justification* samples on the *USB* in the *DMC Samples* folder and use the marking criteria to select which statement best describes the level of achievement for that sample, enter your marks in the table below.
4. On page 43 of the *Resource book* there is another set of criteria from the *Marking Guidelines* for the *Timeline and Finance Plan*.
5. Highlight the word(s) that differentiate each criterion.
6. Refer to the Finance Plan samples on the *USB* in the *DMC Samples* folder and use the marking criteria to select which statement best describes the level of achievement for that sample, enter your marks in the table below.

Selection and Justification	Mark range
Sample 1	
Sample 2	
Sample 3	

Costing	Mark range
Sample 1	
Sample 2	
Sample 3	

Activity 3b – Quality practical work

The aim of this session is to:

- develop skills to advise students in the selection of suitable projects and to ensure quality projects
- discover a range of tips and techniques for each focus area.

Discussion

1. Selecting a major project.
2. Advising students.
3. Notes from the marking centre.
 - Design and management
 - Communication
 - Production
4. Using the marking checklist.

Simulated marking exercise

1. Open the folder titled *DMC – Folios* on the *USB* where there are three Photostories that describe three different projects:
 - Chess Table
 - Occasional Table
 - Workbench
2. Observe the marking process for the *Occasional Table* to determine how a mark is decided upon for the criterion: *Evidence of a Range of Skills*.
3. Open the folder titled *DMC – Folios* on the *USB*, view the Photostory for the *Chess Table* or the *Workbench*, the *Folio Extract – Chess Table* or *Workbench* and use the *Production Marking Guidelines* on page 45 to assist with your decision.
4. Record your decision by circling the appropriate mark range below.

40–33	32–25	24–17	16–9	8–1
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Tips from experienced teachers

1. On page 46 of the *Resource book* are some tips from experienced teachers to assist teachers and students in each focus area.