



INDUSTRIAL TECHNOLOGY TRADES

COURSE FRAMEWORK

INTRODUCTION

All programs of study for the ACT Year 12 Certificate should enable students to become:

- creative and critical thinkers
- enterprising problem-solvers
- skilled and empathetic communicators
- informed and ethical decision-makers
- environmentally and culturally aware citizens
- confident and capable users of technologies
- independent and self-managing learners
- collaborative team members

and provide students with:

- a comprehensive body of specific knowledge, principles and concepts
- a basis for self-directed and lifelong learning
- personal attributes enabling effective participation in society.

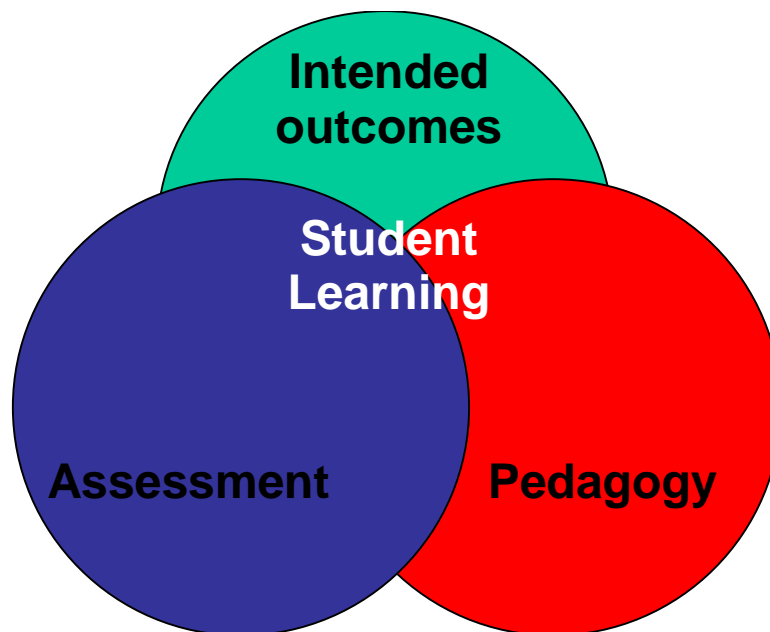
Examples of these student capabilities are provided at Appendix A.

COURSE FRAMEWORKS

Course Frameworks provide the basis for the development and accreditation of any course within a broad subject area and provide a common basis for the assessment, moderation and reporting of student outcomes in courses based on the Framework.

Courses under the Industrial Technology Trades Course Framework include (but are not limited to) general construction, metals and engineering, automotive and furnishings. All courses will be based on national training packages.

Course Frameworks support a model of learning that integrates intended student outcomes, pedagogy and assessment. This model is underpinned by a set of beliefs and a set of learning principles.



Underpinning beliefs

- All students are able to learn.
- Learning is a partnership between students and teachers.
- Teachers are responsible for advancing student learning.

Learning principles

1. Learning builds on existing knowledge, understandings and skills.
(Prior knowledge)
2. When learning is organised around major concepts, principles and significant real world issues, within and across disciplines, it helps students make connections and build knowledge structures.
(Deep knowledge and connectedness)
3. Learning is facilitated when students actively monitor their own learning and consciously develop ways of organising and applying knowledge within and across contexts.
(Metacognition)
4. Learners' sense of self and motivation to learn affect learning.
(Self-concept)
5. Learning needs to take place in a context of high expectations.
(High expectations)
6. Learners learn in different ways and at different rates.
(Individual differences)
7. Different cultural environments, including the use of language, shape learners' understandings and the way they learn.
(Socio-cultural effects)
8. Learning is a social and collaborative function as well as an individual one.
(Collaborative learning)
9. Learning is strengthened when learning outcomes and criteria for judging learning are made explicit and when students receive frequent feedback on their

progress.
(*Explicit expectations and feedback*)

RATIONALE

Courses developed under the Industrial Technology Trades Course Framework are intended to meet the needs of students who have a general interest in industry trades/technology as well as those intending to choose a career pathway into the traditional trades and related service industries.

Australia is currently experiencing a skills shortage in traditional trade areas. There is also an increasing demand in Australia and elsewhere for people able to assume highly skilled roles in areas deploying rapidly developing technologies. There is a need for more highly trained new workers and up-skilling of existing workers in the manufacturing and service industries as the levels of newer technologies are increased. For example, there are vastly more complex electronics to be fitted and serviced in the automotive industry and new materials and techniques in the building industry. Everybody is affected to some degree by the need to understand and effectively use advancing technology in the workshop, the construction site, the factory, office, home or farm.

The range of skills and knowledge in the manufacturing and service industries has increased and will continue to increase. Because new technologies are constantly replacing recent ones, there is a great need for people involved at any level in the production or use of them to be adaptable. They need to be able to acquire knowledge quickly and to develop and apply new skills effectively. It is also important to maintain traditional skills and attitudes used in older technologies where they underpin and support the newer technologies.

There is an increasing tendency for workers to have several career changes during their lifetime and there are pressures on people to extend their working lives. These changes require retraining that may be funded by industry, but is very often the responsibility of the individual. It is therefore vital for people to have an education that includes Industrial Technology at the senior secondary level. This will provide them with the best possible base for lifelong learning and for pursuing relevant career choices.

GOALS

Course Framework Goals focus on the essential things that students should know and be able to do as a result of studying any course in this subject area. They are **intended student outcomes**.

All courses based on this Course Framework should enable students to:

- understand the concepts, techniques, terminology and content appropriate to the industry focus of the course
- demonstrate practical skills and safe workshop habits when making or repairing products
- relate basic mathematical and scientific principles to practical applications
- demonstrate problem solving ability, incorporating evaluation techniques and skills
- communicate clearly in written and oral form

- demonstrate employment-related skills in working independently and cooperatively and in making informed decisions about career paths.

GUIDE TO THE SELECTION OF CONTENT

Courses developed under this Course Framework will provide details of course content through the component units of the course. While this content will differ according to the particular course classification (A, T or M, including vocational programs), all content will be chosen to enable students to work towards the achievement of the common and agreed goals of the Course Framework.

Essential concepts and skills

All courses developed under this Course Framework will be based on the essential concepts and skills of the subject area, as outlined below.

The essential concepts and content of courses developed under this Industrial Technology Trades Course Framework will be guided by the industry endorsed Training Package, for example in:

- General Construction
- Metals and Engineering
- Automotive
- Furnishings.

The essential skills of courses written under the Industrial Technology Trades Course Framework are:

- Manipulative and physical skills relating to the specific industry concerned.
- Communication skills (listening and understanding, reading independently, sharing information, using numeracy)
- Teamwork (sharing/defining roles and responsibilities, recognising and responding to individuals strengths/weaknesses)
- Problem-solving (developing practical solutions according to the situation)
- Self management (taking responsibility, evaluating and monitoring own performance) Planning and organising (managing time and priorities, decision making and initiative)
- Healthy and safe behaviour in workshop practice.

VOCATIONAL COURSES

Colleges with Registered Training Organization status (RTO) are eligible to deliver units of competence from Training Packages, or alternatively, they may develop vocational courses, classified as A or T based on the Training Packages, under this Course Framework.

PEDAGOGY

Teaching strategies

Teaching strategies that are particularly relevant and effective in courses under this Framework include:

- hands-on experiences and demonstrations
- work placements, workplace visits, fieldwork and observation of professional establishments
- establishing links with individuals or groups relevant to the industry
- instructing students in appropriate relevant and effective professional conduct and knowledge acquisition
- student reflection on the relevant skills
- practice and reinforcement of learning by way of revision, worksheets, tests, and demonstrations
- use of information and communication technologies
- class discussions, oral presentations and group work.

Strategies should help students:

- gain confidence through building new learning on what they already know and can do
- connect their personal worlds with their experiences at school, in the community and in workplaces
- understand their own strengths and weaknesses and how they learn most effectively
- take responsibility through planning and action
- develop practical skills through community and work-related experiences
- increase their competence in the application of technologies
- work effectively with others.
- work safely in different situations.

ASSESSMENT

The purpose of including assessment task types (with examples of tasks) and assessment criteria in Course Frameworks is to provide a common and agreed basis for the collection of evidence of student achievement. This collection of evidence enables a comparison of achievement within and across colleges, through moderation processes. This enables valid, fair and equitable reporting of student achievement on the Year 12 Certificate.

Assessment tasks elicit responses that demonstrate the degree to which students have achieved the goals of a unit (and the course as a whole).

Assessment Task Types (with **weightings**) group assessment tasks in ways that reflect agreed shared practice in the subject area and facilitate the comparison of student work across different assessment tasks.

Assessment Criteria (the dimensions of quality that teachers look for in evaluating student work) provide a common and agreed basis for judgement of performance against unit and course goals, within and across colleges. Over a course, teachers use all of these criteria to assess students' performance, but do not necessarily use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

Assessment Rubrics draw on the general course framework criteria to develop assessment criteria for a task type and a continuum that indicates levels of student performance against each criterion.

Assessment Task Types

Task types with examples of tasks	Practical Application	Written Work	Workplace Processes
	eg <ul style="list-style-type: none"> • Practical Test • Individual Project • Team Project • On-the-job work placements 	eg <ul style="list-style-type: none"> • Job Cards • Folio • Written Test • Assignment • Research Project 	eg <ul style="list-style-type: none"> • Cooperative tasks • Planning tasks • Problem Solving • Risk Assessments • Quality control procedures
Weighting	50-70%	15-30%	15-30%

Assessment Criteria

Students will be assessed on the degree to which they demonstrate:

- Industry specific skills
- Understanding, use and communication of industrial knowledge
- Understanding and use of Occupational Health and Safety (OH&S) procedures
- Self-management, teamwork and communication in workshop practice.

Tables showing the relationship between Task Types and the criteria, with an example of what might appear in a unit outline, are provided at Appendix B. An **assessment rubric** has been developed for an Individual Project (Practical Applications). This is included at Appendix C.

Additional Assessment Advice

Units of competency must be assessed using the Training Package as a guide.

Relating Assessment Task Types and Assessment Criteria to the Course Framework Goals

The congruence between goals, assessment task types (the evidence) and the assessment criteria (the basis for judging the evidence) is vital in teaching and learning. The following table shows these relationships.

GOALS	ASSESSMENT TASK TYPES	ASSESSMENT CRITERIA
Understand the concepts, techniques, terminology and content appropriate to the industry focus of the course	Written Work (eg Individual Assignments, Tests)	Understanding, use and communication of Industrial Knowledge Industry Specific Skills Understanding and use of OHS Procedures
Demonstrate practical skills and safe workshop habits when making or repairing products	Practical Applications (eg Practical Test, Individual Project, Team Project)	Workshop Practice Understanding, use and communication of Industrial Knowledge Industry Specific Skills Understanding and use of OHS Procedures
Relate basic mathematical and scientific principles to practical applications	Practical Applications and Workplace Processes (eg Project work, Sketching, Planning/Problem Solving tasks)	Workshop Practice Understanding, use and communication of Industrial Knowledge Industry Specific Skills
Demonstrate their problem solving ability, incorporating evaluation techniques and skills	Practical Applications and Workplace Processes (eg Project work, Risk Assessments, Planning/Problem Solving tasks)	Workshop Practice Industry Specific Skills Understanding and use of OHS Procedures
Communicate clearly in written and oral form	Practical Applications, Written Work and Workplace Processes (eg Assignment work, Job cards, Folio, Team Projects, Individual Projects, Risk Assessments)	Workshop Practice Understanding, use and communication of Industrial Knowledge Industry Specific Skills Understanding and use of OHS Procedures
Demonstrate employment-related skills in working independently and in a team and in making informed decisions	Practical Applications & Workplace Processes (eg Team Project, Individual Project, Folio, Job Card, Planning tasks, Problem Solving tasks, Assignments Tests Research	Workshop Practice Understanding, use and communication of Industrial Knowledge Industry Specific Skills Understanding and use of

GOALS	ASSESSMENT TASK TYPES	ASSESSMENT CRITERIA
about career paths	projects, Quality Control Procedures	OHS Procedures

ACHIEVEMENT STANDARDS

Grade descriptors provide a guide for teacher judgement of students' achievement, based on the assessment criteria, over a unit of work in this subject. Grades are organized on an A-E basis and represent standards of achievement.

Grades are awarded on the proviso that the assessment requirements have been met. Teachers will consider, when allocating grades, the degree to which students demonstrate their ability to complete and submit tasks within a specified time frame.

The following descriptors are consistent with the **system grade descriptors** which describe generic standards of student achievement across all courses.

Unit Grade Descriptors for A Courses

Grade	Descriptor
A student who achieves the grade A typically	<p>Industry specific skills:</p> <ul style="list-style-type: none"> demonstrates excellent skills in the workshop <p>Understanding, use and communication of industrial knowledge:</p> <ul style="list-style-type: none"> investigates and critically applies knowledge and skills specific to the industry; clearly and succinctly communicates applied knowledge and skills specific to the industry <p>Understanding and use of OHS procedures:</p> <ul style="list-style-type: none"> operates in a safe manner in the workshop environment <p>Self-management, teamwork and communication in workshop practice:</p> <ul style="list-style-type: none"> has a high level of independence but can also lead others effectively and co-operatively; excellent planning and problem solving skills with consistently high work quality control

<p>A student who achieves the grade B typically</p>	<p>Industry specific skills:</p> <ul style="list-style-type: none"> • demonstrates a high level of skills in the workshop <p>Understanding, use and communication of industrial knowledge:</p> <ul style="list-style-type: none"> • investigates and applies knowledge specific to the industry; uses suitable and correct industrial terminology <p>Understanding and use of OHS procedures:</p> <ul style="list-style-type: none"> • operates in a safe manner in the workshop environment <p>Self-management, teamwork and communication in workshop practice:</p> <ul style="list-style-type: none"> • works effectively, both independently or within a team; shows sound planning and problem solving skills; applies quality procedures
<p>A student who achieves the grade C typically</p>	<p>Industry specific skills:</p> <ul style="list-style-type: none"> • demonstrates a competent level of skills in the workshop <p>Understanding, use and communication of industrial knowledge:</p> <ul style="list-style-type: none"> • has a general understanding of the industry specific knowledge; uses suitable industrial terminology <p>Understanding and use of OHS procedures:</p> <ul style="list-style-type: none"> • operates in a safe manner in the workshop environment <p>Self-management, teamwork and communication in workshop practice:</p> <ul style="list-style-type: none"> • works co-operatively; solves problems with assistance; has a general understanding of quality procedures
<p>A student who achieves the grade D typically</p>	<p>Industry specific skills:</p> <ul style="list-style-type: none"> • demonstrates most of the skills in the workshop <p>Understanding, use and communication of industrial knowledge:</p> <ul style="list-style-type: none"> • has limited industry specific knowledge and use of industrial terminology <p>Understanding and use of OHS procedures:</p> <ul style="list-style-type: none"> • operates in a safe manner in the workshop environment <p>Self-management, teamwork and communication in workshop practice:</p> <ul style="list-style-type: none"> • is developing some self-management and teamwork skills; solves problems with assistance; demonstrates some aspects of quality procedures

<p>A student who achieves the grade E typically</p>	<p>Industry specific skills:</p> <ul style="list-style-type: none"> • demonstrates some of the skills required in the workshop <p>Understanding, use and communication of industrial knowledge:</p> <ul style="list-style-type: none"> • is developing basic knowledge of the industry and industrial terminology <p>Understanding and use of OHS procedures:</p> <ul style="list-style-type: none"> • operates in a safe manner in the workshop environment <p>Self-management, teamwork and communication in workshop practice:</p> <ul style="list-style-type: none"> • works on guided tasks with direction; is developing some self-management and teamwork skills
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MODERATION

Moderation is a system designed and implemented to:

- provide comparability in the system of school-based assessment
- form the basis for valid and reliable assessment in senior secondary schools
- involve the ACT Board of Senior Secondary Studies and colleges in cooperation and partnership
- maintain the quality of school-based assessment and the credibility, validity and acceptability of Board certificates.

Moderation commences within individual colleges. Teachers develop assessment programs and instruments, apply assessment criteria, and allocate Unit Grades, according to the relevant Course Framework. Teachers within course teaching groups conduct consensus discussions to moderate marking or grading of individual assessment instruments and unit grade decisions.

The Moderation Model

Moderation within the ACT encompasses structured, consensus-based peer review of Unit Grades for all accredited courses, as well as statistical moderation of course scores, including small group procedures, for ‘T’ courses.

Moderation by Structured, Consensus-based Peer Review

Review is a subcategory of moderation, comprising the review of standards and the validation of Unit Grades. In the review process, Unit Grades, determined for Year 11 and Year 12 student assessment portfolios that have been assessed in schools by teachers under accredited courses, are moderated by peer review against system wide criteria and standards. This is done by matching student performance with the criteria and standards outlined in the unit grade descriptors as stated in the Course Framework. Advice is then given to colleges to assist teachers with, and/or reassure them on, their judgments.

Preparation for Structured, Consensus-based Peer Review

Each year, teachers teaching a Year 11 class are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers teaching a Year 12 class should retain originals or copies of student work completed in Semester 1.

Assessment and other documentation required by the Office of the Board of Senior Secondary Studies should also be kept. Year 11 work from Semester 2 of the previous year is presented for review at Moderation Day 1 in March, and Year 12 work from Semester 1 is presented for review at Moderation Day 2 in August.

In the lead up to Moderation Day, a College Course Presentation (comprised of a document folder and a set of student portfolios) is prepared for each A and T course offered by the school, and is sent in to the Office of the Board of Senior Secondary Studies.

The College Course Presentation

The package of materials (College Course Presentation) presented by a college for review on moderation days in each course area will comprise the following:

- a folder containing supporting documentation as requested by the Board Secretariat through memoranda to colleges
- a set of student portfolios containing marked and/or graded written and non-written assessment responses and completed criteria and standards feedback forms. Evidence of all assessment responses on which the unit grade decision has been made is to be included in the student review portfolios.

Specific requirements for subject areas and types of evidence to be presented for each moderation day will be outlined by the Board Secretariat through memoranda and Information Papers.

BIBLIOGRAPHY

References for Curriculum Development

Key documents for course development are the relevant training package and the following BSSS documents and links:

Guidelines for the Development and Accreditation of Courses that lead to a Nationally Recognised Training Qualification (current edition, BSSS)

<http://www.decs.act.gov.au/bsss/Publicat.htm>

BSSS Course Frameworks

<http://www.decs.act.gov.au/bsss/frameworks.htm>

Other state and territory sites and related information

<http://www.decs.act.gov.au/bsss/sites.htm>

Teacher References in Industry Technology Trades

Detailed lists of texts and resources are best provided in specific courses rather than in this Course Framework.

COURSE FRAMEWORK DEVELOPMENT GROUP

Name	College
Alan Boate	Erindale College
Frank Hansby	St Edmunds College
Mark Neathercote	Lake Ginninderra College
Tom Beck	Hawker College

The group gratefully acknowledges the work of previous groups who developed and revised the Automotive Technology and the Design and Technology Course Frameworks.

APPENDIX A

All programs of study for the ACT Year 12 Certificate should enable students to become:

	The examples are indicative and not exhaustive. Those in bold relate particularly to the Employability Skills; those in <i>italics</i> to the Across Curriculum Perspectives.
<ul style="list-style-type: none"> creative and critical thinkers 	exploring, imagining, observing, predicting, thinking laterally, generating ideas, inquiring and researching , interrogating, conceptualising, collecting and analysing data and information, classifying , interpreting, formulating hypotheses, generalising, synthesising, reflecting , justifying conclusions, understanding different perspectives, understanding and application of different thinking strategies, understanding of scientific and mathematical language, using scientific and mathematical techniques (eg estimating, reading and interpreting data, interpolation and extrapolation)
<ul style="list-style-type: none"> enterprising problem-solvers 	showing initiative, resourcefulness , resilience, persistence, assessing and taking risks, recognising and seizing opportunities, problem-posing, problem-identification, problem clarification , being practical, being innovative , using mathematical techniques, using appropriate technologies, working independently and/or collaboratively to achieve a solution, testing assumptions and solutions, modifying approaches
<ul style="list-style-type: none"> skilled and empathetic communicators 	oral and written skills in Standard Australian English, matching communication to audience and purpose , using terminology and style appropriate to particular disciplines, using mathematical language , creating and communicating meaning using multi-modal forms, imagining the feelings and views of others , respecting and valuing diversity
<ul style="list-style-type: none"> informed and ethical decision-makers 	finding information and using evidence as the basis for judgements and decisions, developing awareness of differing perspectives , having integrity, taking action, exploring and critically reflecting on own values, attitudes and beliefs
<ul style="list-style-type: none"> environmentally and culturally aware citizens 	understanding <i>the interconnectedness of the natural and constructed world</i> ; <i>the multicultural nature of Australian society</i> ; <i>Indigenous perspectives</i> ; and global economic, social and <i>environmental</i> issues; <i>respecting difference</i> , exercising rights and responsibilities, acting in the public sphere , understanding consequences of choices and decisions
<ul style="list-style-type: none"> confident and capable users of technologies 	having a range of IT skills , accessing and evaluating <i>information</i> , designing and making, communicating using technologies, choosing most appropriate technologies for the task , refining processes, willingness to learn new skills
<ul style="list-style-type: none"> independent and self- 	eg understanding self (<i>including gender</i>), having personal goals, evaluating and monitoring own performance ,

managing learners	taking responsibility , flexibility in adapting course of action, openness to new ideas , managing time and resources , planning and organising
<ul style="list-style-type: none"> collaborative team members 	eg contributing to group effectiveness , building trust , capacity to take different roles within a team , respecting differing strengths (<i>including contributions of boys and girls</i>), skills in negotiation and compromise , sustaining commitment to achieve group goals

and provide students with

<ul style="list-style-type: none"> a comprehensive body of specific knowledge, principles and concepts 	through subjects, cross-disciplinary courses and/or projects, work experience
<ul style="list-style-type: none"> a basis for self-directed and lifelong learning 	through understanding and managing self , developing capabilities and modelling an approach (' taking stock , taking steps ') that prepares for an social and economic environment of greater individual responsibility
<ul style="list-style-type: none"> personal attributes enabling effective participation in society 	developing social skills and capabilities for citizenship, work experience and recognition of outside learning ; through understanding of a globalised knowledge society

APPENDIX B

Relationships between Task Types and Assessment Criteria

Criteria	Practical Application	Written Work	Workplace Processes
	<ul style="list-style-type: none"> Practical Test Individual Project Team Project On-the-job work placements 	<ul style="list-style-type: none"> Job Cards Folio Written Test Assignment Research Project 	<ul style="list-style-type: none"> Cooperative tasks Planning tasks Problem Solving Risk Assessments Quality control procedures
Industry Specific Skills	✓	✓	
Understand and use Industrial Knowledge	✓	✓	✓
Workshop Practice	✓	✓	✓
Understand and use OHS Procedures	✓	✓	✓

Below is an **example** of what could appear in a unit outline in a semester. It is not prescriptive. Individual tasks are decided by individual teachers.

Students will be assessed on the degree to which they demonstrate:

Criteria	Task 1 Individual Project	Task 2 Practical Test	Task 3 Job Cards	Task 4 Written Assignment	Task 5 Quality control task
	Practical Applications		Written work		Workplace processes
Industry Specific Skills	✓	✓	✓		
Understand and use Industrial Knowledge		✓		✓	✓
Understand and use OHS Procedures	✓	✓	✓	✓	✓
Workshop Practice	✓	✓	✓		✓
Weighting	50%	10%	10%	15%	15%

APPENDIX C

Sample Marking Rubric: Example Task: Individual Project - making a product*

Criteria	A student can achieve A	A student can achieve B	A student can achieve C	A student can achieve D	A student can achieve E
Industry Specific Skills	Effectively performs all technical skills/procedures to workplace standard required, including correct use of any equipment.	Performs all technical skills/procedures to workplace standard required, including correct use of any equipment.	Performs key technical skills/ procedures to the standard required in the workplace	Has some key technical skills/procedures.	Developing key technical skills.
Understand and use Industrial Knowledge	Demonstrates a thorough understanding and applies all key concepts and knowledge underpinning the work project. Effectively applies these understandings in the completion of the project.	Displays a sound understanding of the key concepts and knowledge underpinning the work project. Proficiently applies understandings in completing work project.	Displays understanding of key concepts and knowledge underpinning the work project. Applies this understanding in the completion of the work project	Demonstrates some understanding of concepts and knowledge of the work project.	Developing understandings of key concepts and knowledge underpinning the work project.
Understanding and use of OHS Procedures	Correct and safe use of equipment and practices.	Correct and safe use of equipment and practices.	Correct and safe use of equipment and practices.	Understands but developing implementation of safe work practices.	Developing an understanding and knowledge of implementation of safe work practices.
Workshop Practice	Always works co-operatively, communicates at a very high level and understands responsibility for standard operation procedures in workshop.	Always works co-operatively and communicates at a high level.	Co-operates and communicates effectively to complete set tasks.	Usually co-operates and communicates in accordance with standard operation procedures in the workshop.	Developing co-operation and communication skills.

*This is draft rubric, requiring further work.