

<b>Training Package</b>	<b>Conservation and Land Management (RTD02), Amenity Horticulture (RTF03) and Rural Production (RTE03)</b>	<b>HSC Requirements and Advice</b>
<b>Title</b>	<b>Operate machinery and equipment</b>	
<b>Unit code</b> <b>RTC2307A</b>	This competency standard covers the maintenance and operation of machinery and equipment. A practical application of skills and knowledge is required to carry out pre-operational checks, calibrate equipment, report faults and maintain operational records. In addition, an awareness of workplace safety and positive environmental practices associated with machinery and equipment operation is essential. This work is likely to be carried out under routine supervision within enterprise guidelines.	<b>HSC Indicative Hours</b>  <b>20</b>

### Evidence Guide

#### What evidence is required to demonstrate competence for this standard as a whole?

Competence in the operation of machinery and equipment requires evidence of the ability to select and utilise various features and controls of a range of machinery and equipment to carry out tasks. It involves the ability to carry out work and maintenance plans, determine appropriate operating methods, carry out routine maintenance and basic repairs, report faults and workplace hazards, monitor operation, and maintain records. Evidence must also be demonstrated in safe workplace and environmentally responsible practices. The skills and knowledge required to operate machinery and equipment must be **transferable** to a different work environment. For example, this could include different machinery and equipment, workplaces and conditions of use.

<b>What specific knowledge is needed to achieve the performance criteria?</b>	<b>What specific skills are needed to achieve the performance criteria?</b>	<b>Are there other competency standards that could be assessed with this one?</b>	<b>Assessment guide</b>	<b>HSC Requirements and Advice</b>
<p>Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this competency standard are listed below:</p> <ul style="list-style-type: none"> <li>• manufacturers specifications for servicing of machinery and equipment</li> <li>• operating principles and operating methods for machinery and equipment</li> <li>• principles of weight distribution with regard to load shifting and machinery movement</li> <li>• procedures for cleaning, securing and storing machinery,</li> </ul>	<p>To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complimentary skills are required. These include the ability to:</p> <ul style="list-style-type: none"> <li>• operate machinery and equipment to industry standards</li> <li>• demonstrate safe and environmentally responsible workplace practices</li> <li>• read and interpret manufacturers specifications, work and maintenance plans, and Material Safety Data Sheets</li> <li>• interpret and apply instructions, communicate with work team and supervisor, record and report equipment faults,</li> </ul>	<p>This competency standard <u>could</u> be assessed on its own or in combination with other competencies relevant to the job function.</p>	<p>There is essential information about <b>assessing this competency standard for consistent performance and where and how it may be assessed</b>, in the Assessment Guidelines for this Training Package. All users of these competency standards must have <b>access</b> to both the <b>Assessment Guidelines</b> and the relevant <b>Sector Booklet</b>.</p>	<p><b>Key Terms and Concepts</b></p> <ul style="list-style-type: none"> <li>• calibration</li> <li>• cleaning, securing and storing machinery, tools and equipment</li> <li>• enterprise requirements</li> <li>• environmental implications</li> <li>• faults and malfunctions</li> <li>• hazards</li> <li>• occupational health and safety (OHS)</li> <li>• operating and servicing machinery and equipment</li> <li>• operational records</li> <li>• personal protective equipment (PPE)</li> <li>• positive environmental practices</li> <li>• pre-operational checks</li> <li>• reporting and recording</li> </ul>

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<p>equipment and materials</p> <ul style="list-style-type: none"> <li>• potential risks and hazards associated with the operation of machinery and equipment</li> <li>• legislation, regulations and Codes of Practice with regard to workplace OHS, and the use and control of hazardous substances</li> <li>• relevant State/Territory legislation, regulations and Codes of Practice with regard to licensing, roads and traffic requirements</li> <li>• environmental impacts and minimisation measures associated with the operation of machinery and equipment.</li> </ul>	<p>workplace hazards, and accidents</p> <ul style="list-style-type: none"> <li>• measure and calculate volumes, consumption and servicing requirements.</li> </ul>			<ul style="list-style-type: none"> <li>• risk assessment</li> <li>• routine maintenance</li> <li>• safe and controlled operation of machinery and equipment</li> <li>• safety checks</li> <li>• safety tagging</li> <li>• shut-down procedures</li> <li>• Standard Operating Procedures (SOP)</li> <li>• work plan.</li> </ul>

Element	Performance Criteria	Range of Variables	HSC Requirements and Advice
1 Prepare machinery and equipment for use	<p>1.1 <b>Machinery and equipment</b> is selected appropriate to job requirements and confirmed against a <b>work plan</b>.</p>	<p>The Range of Variables explains the range of context within which the performance and knowledge requirements of this standard may be assessed. The scope of variables chosen in training and assessment may depend on the work situations available.</p> <p>For more information on contexts, environment and variables for training and assessment refer to the Sector Booklet.</p> <p>What range of <b>machinery</b> and <b>equipment</b> may be applicable to this standard?</p> <p>Hydraulic equipment, stationary engines, spraying equipment, stump grinders, mulchers and chippers equipment, powered trailer and three point linkage equipment. Excludes chainsaws, tractors, vehicles and earth moving equipment.</p> <p>What may be included in a <b>work plan</b>? Pre-operational and safety checks, routine maintenance procedures, designated job tasks, equipment, resources and materials for use, supervisors instructions, timeframe for work completion and reporting requirements</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Components of a work plan including:</p> <ul style="list-style-type: none"> <li>• pre-operational and safety checks</li> <li>• routine maintenance procedures</li> <li>• designated job tasks</li> <li>• equipment</li> <li>• resources and materials for use</li> <li>• supervisor's instructions</li> <li>• timeframe for work completion</li> <li>• reporting requirements.</li> </ul>
	<p>1.2 Routine <b>pre-operational checks</b> of machinery and equipment are carried out to manufacturers specifications and <b>enterprise requirements</b></p>	<p>What may be involved in routine <b>pre-operational checks</b> of machinery and equipment?</p> <ul style="list-style-type: none"> <li>• Pre-start and safety checks including the service and maintenance of cooling system.</li> <li>• Checking fuel, oils and lubricants, electrolyte levels, wheels, tyre pressure, fan belts, leads, lines, connections, air filters, brakes, clutch, gearbox, steering, lighting, and transmission.</li> <li>• Inspection of safety guards, PTO stubs and shafts, and hitch and towing points.</li> <li>• Checking and confirming equipment calibration settings and operating methods for turbo-charged engines.</li> </ul>	<p><b>Learning experiences for the HSC must address:</b></p> <p>An awareness of pre-operational checks appropriate to work tasks including:</p> <ul style="list-style-type: none"> <li>• pre-start and safety checks including <ul style="list-style-type: none"> <li>– cooling system</li> <li>– fuel</li> <li>– oils and lubricants</li> <li>– electrolyte levels</li> <li>– wheels</li> <li>– tyre pressure</li> <li>– fan belts</li> <li>– leads</li> <li>– lines</li> <li>– connections</li> <li>– air filters</li> </ul> </li> </ul>

Element	Performance Criteria	Range of Variables	HSC Requirements and Advice
		<ul style="list-style-type: none"> <li>• Observing and monitoring noise levels for correct operation.</li> <li>• Preparation of independently powered tools may include cleaning, priming, tightening, basic repairs and adjustments.</li> <li>• Identify and segregate unsafe or faulty equipment for repair or replacement.</li> </ul> <p>What <b>enterprise requirements</b> may apply to this standard?</p> <p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.</p>	<ul style="list-style-type: none"> <li>- brakes</li> <li>- clutch</li> <li>- gearbox</li> <li>- steering</li> <li>- lighting</li> <li>- transmission</li> <li>• inspections of <ul style="list-style-type: none"> <li>- safety guards</li> <li>- power take-off (PTO) stubs</li> <li>- power take-off (PTO) shafts</li> <li>- hitch points</li> <li>- towing points</li> </ul> </li> <li>• calibration of equipment</li> <li>• observing and monitoring noise level</li> <li>• power tool preparation including <ul style="list-style-type: none"> <li>- cleaning</li> <li>- priming</li> <li>- tightening</li> <li>- basic repairs</li> <li>- adjustments</li> </ul> </li> <li>• segregation of unsafe or faulty equipment.</li> </ul>
	1.3 Equipment is securely attached and calibrated for operation to manufacturers specifications.		
	1.4 Faulty machinery and equipment is identified, safety tagged, and reported to supervisor according to enterprise requirements.	<p>What range of <b>machinery</b> and <b>equipment</b> may be applicable to this standard?</p> <p>Hydraulic equipment, stationary engines, spraying equipment, stump grinders, mulchers and chippers equipment, powered trailer and three point linkage equipment. Excludes chainsaws, tractors, vehicles and earth moving equipment.</p> <p>What <b>enterprise requirements</b> may apply to this standard?</p> <p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Identification of faulty machinery and equipment including:</p> <ul style="list-style-type: none"> <li>• malfunctions</li> <li>• broken or missing safety guards</li> <li>• unusual noise</li> <li>• broken or missing parts.</li> </ul> <p>Reasons for safety tagging including:</p> <ul style="list-style-type: none"> <li>• ease of identification</li> <li>• preventing use until repaired.</li> </ul> <p>Reporting methods including:</p> <ul style="list-style-type: none"> <li>• verbal</li> <li>• written reports</li> </ul>

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		<p>manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.</p>	<ul style="list-style-type: none"> <li>- pre-start checklists</li> <li>• tagging out dangerous or faulty machinery.</li> <li>- documentation of maintenance</li> <li>- maintenance schedules</li> <li>- fault documentation and reporting</li> <li>- repair job cards.</li> </ul>
	<p>1.5 <b>OHS hazards</b> in the workplace are identified, risk assessed and reported according to enterprise requirements.</p>	<p>What OHS <b>hazards</b> may be encountered in the workplace?</p> <p>This may include exposure to loud noise and fumes, solar radiation, dust, ergonomic hazards associated with posture and vibration, hazardous substances (fuel, oils, fertiliser), oil and grease spills. It may also include the presence of bystanders, livestock and wildlife, difficult terrain and varying gradients, potholes, ditches, gullies, embankments, obstacles (rocks, logs, fences, debris, buildings), extreme weather conditions, electricity, overhead powerlines, mechanical malfunctions and exposed moving parts, and other machinery including hydraulics.</p> <p>What <b>enterprise requirements</b> may apply to this standard?</p> <p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>An awareness of potential hazards including:</p> <ul style="list-style-type: none"> <li>• physical hazards <ul style="list-style-type: none"> <li>- unsafe tools and equipment</li> <li>- uneven surfaces</li> <li>- fatigue</li> <li>- electricity</li> <li>- chemical or fuel spill</li> <li>- fumes</li> <li>- noise</li> <li>- dust</li> <li>- missing guards</li> <li>- oil and grease spills</li> <li>- obstacles</li> </ul> </li> <li>• biological <ul style="list-style-type: none"> <li>- hazardous substances</li> </ul> </li> <li>• ergonomic <ul style="list-style-type: none"> <li>- inappropriate use or tools, equipment and machinery</li> <li>- poor manual handling</li> </ul> </li> <li>• environmental <ul style="list-style-type: none"> <li>- climate</li> <li>- disposal of waste</li> <li>- solar radiation</li> </ul> </li> <li>• psychological <ul style="list-style-type: none"> <li>- dealing with emergencies</li> <li>- working alone</li> <li>- isolation.</li> </ul> </li> </ul> <p>A basic understanding of risk assessment:</p> <ul style="list-style-type: none"> <li>• identify hazard</li> <li>• assess associated risks</li> <li>• strategies to control/eliminate risks.</li> </ul>

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2 Operate machinery and equipment	2.1 Machinery and equipment is operated in a <b>safe and controlled</b> manner, and monitored for performance and efficiency.	<p>What range of <b>machinery and equipment</b> may be applicable to this standard?</p> <p>Hydraulic equipment, stationary engines, spraying equipment, stump grinders, mulchers and chippers equipment, powered trailer and three point linkage equipment. Excludes chainsaws, tractors, vehicles and earth moving equipment.</p> <p>How might <b>safe and controlled</b> operation of machinery and equipment be demonstrated?</p> <p>This may include:</p> <ul style="list-style-type: none"> <li>• Appropriate selection and use of machinery and equipment.</li> <li>• Using operational techniques for the specific terrain (on and off-road environments) and weather conditions.</li> </ul> <p>Maintaining working loads within specifications including ensuring hitch-points are operated at the correct height.</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Safe and controlled operation of machinery and equipment including:</p> <ul style="list-style-type: none"> <li>• appropriate selection and use of machinery and equipment for the job to be undertaken</li> <li>• using operational techniques for specific terrain and weather conditions</li> <li>• maintaining working loads within specifications</li> <li>• prevention of damage to vehicle, equipment, person or property</li> <li>• use of personal protective equipment (PPE)</li> <li>• using appropriate machinery and equipment for the designated task.</li> </ul> <p>Signs of performance and efficiency including:</p> <ul style="list-style-type: none"> <li>• noise</li> <li>• quality of end product</li> <li>• appearance</li> <li>• vibration</li> <li>• rough running</li> <li>• failure to start</li> <li>• presence of smoke and odours</li> <li>• consumption of fuel and other consumables</li> <li>• wheel slip</li> <li>• blockages</li> <li>• amount of maintenance required</li> <li>• time taken to complete the job.</li> </ul>
	2.2 Risks to self, others and the environment are recognised and minimised according to enterprise and OHS requirements.	<p>What <b>enterprise requirements</b> may apply to this standard?</p> <p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.</p> <p>What <b>OHS</b> requirements may be relevant to this standard?</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Risk management including:</p> <ul style="list-style-type: none"> <li>• safe operation machinery and equipment</li> <li>• hazard and risk control</li> <li>• safe mounting and dismounting</li> <li>• correct manual handling including lifting and carrying</li> <li>• handling, application and storage of hazardous substances</li> <li>• correct work loads</li> <li>• the appropriate use, maintenance and storage of PPE</li> <li>• regular servicing and maintenance of machinery and equipment.</li> </ul>

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		<p>Systems and procedures for:</p> <ul style="list-style-type: none"> <li>• the safe operation and maintenance, machinery and equipment including hydraulics, and guarding of exposed moving parts.</li> <li>• hazard identification, assessment and reporting emergency operating and defensive driving procedures.</li> <li>• ensuring working loads are secure and within working specifications.</li> <li>• safe lifting, carrying and handling.</li> <li>• appropriate use, maintenance and storage of personal protective equipment.</li> <li>• outdoor work including protection from solar radiation.</li> <li>• passengers only been carried where there is a seat provided by manufacturer.</li> <li>• protection of people in the workplace.</li> <li>• protection from hazardous noise, mechanical vibration, and organic and other dusts.</li> </ul>	
	<p>2.3 Suitable <b>personal protective clothing and equipment</b> is selected, used, maintained and stored according to OHS requirements.</p>	<p>What <b>personal protective clothing and equipment</b> may be relevant to this standard?</p> <p>Boots, hat/hard hat, overalls, gloves, protective eyewear, hearing protection, respirator or facemask, and sun protection (sun hat, sunscreen).</p> <p>What <b>OHS</b> requirements may be relevant to this standard?</p> <p>Systems and procedures for:</p> <ul style="list-style-type: none"> <li>• the safe operation and maintenance, machinery and equipment including hydraulics, and guarding of exposed moving parts.</li> <li>• hazard identification, assessment and reporting emergency operating and defensive driving procedures.</li> <li>• ensuring working loads are secure and within working specifications.</li> <li>• safe lifting, carrying and handling.</li> <li>• appropriate use, maintenance and storage of</li> </ul>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Selection, use, maintenance and storage of PPE appropriate to work task.</p> <p>A range of PPE including:</p> <ul style="list-style-type: none"> <li>• footwear</li> <li>• head protection – hard hat, sun hat and helmet</li> <li>• gloves</li> <li>• overalls</li> <li>• apron</li> <li>• respirator</li> <li>• face mask</li> <li>• hearing protection</li> <li>• eye protection – goggles, safety glasses and face guard</li> <li>• sunscreen</li> <li>• waterproof clothing.</li> </ul> <p>Importance of correct fitting PPE.</p> <p>Maintenance of PPE according to manufacturer’s</p>

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		<p>personal protective equipment.</p> <ul style="list-style-type: none"> <li>• outdoor work including protection from solar radiation.</li> <li>• passengers only been carried where there is a seat provided by manufacturer.</li> <li>• protection of people in the workplace.</li> <li>• protection from hazardous noise, mechanical vibration, and organic and other dusts.</li> </ul>	<p>instructions and enterprise Standard Operating Procedures (SOP):</p> <ul style="list-style-type: none"> <li>• cleaning and decontamination</li> <li>• correct storage</li> <li>• regular checks for damage</li> <li>• repair/replacement of worn, malfunctioning or damaged equipment/parts</li> <li>• disposal of single-use equipment.</li> </ul>
	<p>2.4 <b>Environmental implications</b> associated with machinery operation are identified, assessed and reported to the supervisor.</p>	<p>What <b>environmental implications</b> may be associated with the operation of machinery and equipment?</p> <p>Negative environmental impacts may result from excessive noise and exhaust emissions, the incorrect use and disposal of maintenance debris (oils containers, chemical residues), and hazardous substances (fuel, fertiliser). Impacts may also include run-off flows of water and cleaning agents from servicing, maintenance and cleaning activities, soil disturbance and dust problems from high speed and frequent traffic (including irrigation equipment).</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Negative environmental impacts that arise from:</p> <ul style="list-style-type: none"> <li>• excessive noise</li> <li>• excessive exhaust emissions</li> <li>• incorrect use and disposal of maintenance debris</li> <li>• hazardous substances</li> <li>• run-off flows of water and cleaning agents</li> <li>• soil disturbance and dust problems.</li> </ul>
<p>3 Check and complete machinery and equipment operation</p>	<p>3.1 Machinery and equipment <b>shut-down</b> procedures are carried out to manufacturers specifications and enterprise requirements.</p>	<p>What procedures may be included in the <b>shut-down</b> of machinery and equipment?</p> <p>Safe dismount procedures (including turning engine off), maintaining a clear thoroughfare, parking away from hazards, securing, engaging handbrake, removing keys, refuelling and cleaning.</p> <p>What range of <b>machinery</b> and <b>equipment</b> may be applicable to this standard?</p> <p>Hydraulic equipment, stationary engines, spraying equipment, stump grinders, mulchers and chippers equipment, powered trailer and three point linkage equipment. Excludes chainsaws, tractors, vehicles and earth moving equipment.</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Shut down procedures including:</p> <ul style="list-style-type: none"> <li>• safe dismount procedures</li> <li>• maintaining a clear thoroughfare</li> <li>• parking away from hazards</li> <li>• securing</li> <li>• engaging handbrake</li> <li>• removing keys</li> <li>• refuelling</li> <li>• cleaning.</li> </ul>
	<p>3.2 Machinery and equipment operational records are maintained according to enterprise requirements.</p>		<p><b>Learning experiences for the HSC must address:</b></p> <p>Machinery and equipment operational records including:</p> <ul style="list-style-type: none"> <li>• log books</li> </ul>

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		<p>What <b>enterprise requirements</b> may apply to this standard?</p> <p>Standard Operating Procedures (SOPs), industry standards, production schedules, Material Safety Data Sheets (MSDSs), work notes, product labels, manufacturers specifications, operators manuals, enterprise policies and procedures</p>	<ul style="list-style-type: none"> <li>• pre-start checklists</li> <li>• maintenance schedules and reports</li> <li>• fault documentation and reporting</li> <li>• tagging out dangerous faulty machinery</li> <li>• repair job cards.</li> </ul>
	<p>3.3 Machinery and equipment damage, malfunctions or irregular performance are recorded and/or reported according to enterprise requirements.</p>	<p>(including waste disposal, recycling and re-use guidelines), OHS procedures, supervisors oral or written instructions, work and routine maintenance plans.</p>	<p><b>Learning experiences for the HSC must address:</b></p> <p>Procedures and documentation for identifying and reporting faults and malfunctions.</p> <p>Personnel to whom problems should be reported:</p> <ul style="list-style-type: none"> <li>• supervisor/manager</li> <li>• supplier/manufacturer.</li> </ul>
	<p>3.4 Machinery and equipment is cleaned, secured and stored according to manufacturers specifications and enterprise requirements.</p>		<p><b>Learning experiences for the HSC must address:</b></p> <p>Cleaning of machinery and equipment including:</p> <ul style="list-style-type: none"> <li>• removal of dirt, dust and any other contaminants</li> <li>• cleaning consistent with operator’s manual</li> <li>• maintenance</li> <li>• refuel and top up consumables.</li> </ul> <p>Securing machinery and equipment including:</p> <ul style="list-style-type: none"> <li>• removal of keys where applicable</li> <li>• parking of equipment</li> <li>• use of hand brakes and wheel chocks</li> <li>• drawbar and three-point linkage stands.</li> </ul> <p>Issues relating to storage of machinery and equipment including:</p> <ul style="list-style-type: none"> <li>• climatic affects</li> <li>• OHS considerations</li> <li>• stability</li> <li>• breakdown of plastics by sunlight</li> <li>• build up of leaves and trash</li> <li>• rodents</li> <li>• rust and corrosion</li> <li>• seizing of moving parts</li> <li>• perishing of rubber components.</li> </ul>

## What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where

0 = not required      1 = perform the process      2 = perform and administer the process      3 = perform, administer and design the process

1. How can <b>communication of ideas and information (1)</b> be applied?	Information and ideas with regard to machinery and equipment, safety procedures and their application may be discussed with colleagues and the supervisor.
2. How can <b>information be collected, analysed and organised (1)</b> ?	Information with regard to the performance and efficiency of machinery and equipment may be observed and recorded for analysis and organised by reports.
3. How are <b>activities planned and organised (1)</b> ?	Activities involving maintenance and repairs to machinery and equipment may be planned and coordinated around work schedules or sequenced as required.
4. How can <b>team work (1)</b> be applied?	Team work may be applied in methods and procedures to complete maintenance and job functions to achieve work plan requirements.
5. How can the use of <b>mathematical ideas and techniques (1)</b> be applied?	Mathematics may be applied in the calculation and measurement of load weights, distance, consumption and oil and fuel requirements.
6. How can <b>problem-solving skills (1)</b> be applied?	Machinery and equipment breakdown, faults or malfunctions will need to be arranged for repair or replacement to achieve work plan requirements.
7. How can the <b>use of technology (1)</b> be applied?	To communicate, measure and record information with regard to maintenance, usage and performance of machinery and equipment.