### Training Package
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<th>Training Package</th>
<th>Rural Production (RTE03)</th>
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### Title
Establish horticultural crops

### Unit code
RTE2010A

### HSC Requirements and Advice
This competency standard covers the process of planting and establishing crops such as fruit, vegetables, flowers, foliage, plants and herbs. Crop planting and establishment is likely to be under routine supervision with intermittent checking. Responsibility for some roles and co-ordination within a team may be required. Competency at this level requires the application of knowledge and skills to a range of planting tasks, including site clearance and preparation, the handling and planting of a range of planting materials, and the care of young plants. Crop establishment activities are usually undertaken within established routines, methods and procedures.

### HSC Indicative Hours
15

### Evidence Guide
What evidence is required to demonstrate competence for this standard as a whole?
Competence in establishing crops requires evidence that a person can interpret a site map, clear the site of old plantings, prepare the soil and site for plantings, prepare the plants, plant the crop and maintain the new crop. The skills and knowledge required to establish crops must be **transferable** to a different work environment. For example, if a person can establish a citrus crop in South Australia they should be able to establish a mango crop in Queensland following a period of induction.

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<tr>
<th>What specific knowledge is needed to achieve the performance criteria?</th>
<th>What specific skills are needed to achieve the performance criteria?</th>
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<tr>
<td>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:</td>
<td>To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complimentary skills are required. These include the ability to:</td>
<td>This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.</td>
<td>There is essential information about <strong>assessing this competency standard for consistent performance and where and how it may be assessed</strong>, in the Assessment Guidelines for this Training Package. All users of these competency standards must have access to the Assessment Guidelines. Further advice may also be sought from the relevant Sector Booklet.</td>
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<td>• principles of sustainable horticultural practices</td>
<td>• participate in teams and contribute to team objectives</td>
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<tr>
<td>• importance of field hygiene and quality control in regard to crop establishment</td>
<td>• communicate with team members and supervisor</td>
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<td>• principles and operations of a range of irrigation systems used for field crops</td>
<td>• read and interpret a range of workplace information</td>
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<td>• nutritional, water and other requirements of the crop</td>
<td>• calibrate equipment</td>
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<td>• the importance of correct timing and procedures for crop planting</td>
<td>• measure quantities of treatment</td>
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<td>• calculate spacings and planting patterns</td>
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<td>• operate machinery to manufacturers specifications and enterprise procedures</td>
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<td>• safely apply appropriate</td>
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### Key Terms and Concepts
- crop establishment program
- crop planting procedures
- crop protection
- crop requirements
- direct seeding
- disease control
- environmental implications
- fertiliser and nutrient application
- field hygiene
- growing media
- hazard identification
- irrigation systems
- machinery, equipment and tools
- occupational health and safety (OHS)
- personal protective equipment (PPE)
- plant treatments
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| • range of pre-planting soil treatments and their importance | agricultural chemicals. |  |  | • planting material
• planting plan
• pre-planting soil treatments
• quality control
• risk assessment
• soil and seedbed preparation
• soil sample testing
• soil treatments/amendments
• Standard Operating Procedures (SOP)
• sustainable farming practices
• transplanting
• treatments
• waste disposal
• weed control |
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<tr>
<td>1.1</td>
<td><strong>Instructions</strong> about establishing the crop are interpreted and clarified with the supervisor.</td>
<td>The Range of Variables explains the contexts within which the performance and knowledge requirements of this standard may be assessed. The scope of variables chosen in particular training and assessment requirements may depend on the work situations available. For more information on contexts, environment and variables for training and assessment refer to the Sector Booklet. What <strong>instructions</strong> may be relevant to this standard? Instructions may include Standard Operating Procedures (SOPs), company policy and procedures in regard crop establishment, specifications, work notes, Material Safety Data Sheets, manufacturers instructions, product labels, or verbal directions from the manager, supervisor, or senior operator.</td>
<td>Learning experiences for the HSC must address: Horticultural crop establishment processes including: - soil and seedbed preparation - cultivation - bed formation - soil tilth - mulching - soil treatments - weed control - slashing - rotary hoeing - herbicides - disease control - soil fumigants - crop rotation - pesticides - direct seeding - crop spacing and density - seeder adjustments - fertiliser and nutrient application - artificial fertilisers - organic fertilisers - soil ameliorants - pH - structure - mulches - application methods - foliar - banded with seed - top dressing - transplanting - irrigation. Information regarding crop establishment: - Standard Operating Procedures (SOP) - agronomic requirements - crop specifications - work notes - Material Safety Data Sheets (MSDS) - machinery operation manuals - product labels.</td>
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<td>1.2</td>
<td>Machinery, equipment and tools are selected and prepared for the task being undertaken.</td>
<td>What machinery, equipment and tools are likely to be used for plant maintenance? Machinery, equipment and tools may include tractors, rotary hoes, cultivators, fertiliser spreaders, surveying and measuring equipment, seeding or planting machinery.</td>
<td>Clear, concise verbal and written communication, using appropriate terminology, with supervisor or senior operator. Learning experiences for the HSC must address: A basic knowledge of the selection and preparation of appropriate machinery, equipment and tools for a variety of tasks including: - tractors - rotary hoes - bed formers - cultivators - fertiliser spreaders - surveying and measuring equipment - direct seeding and transplanting machinery - irrigation equipment - pesticide application equipment. Preparation for the use of machinery and equipment including: - following SOP - pre-start checks - calibration and adjustment - routine maintenance - cleaning and storage. Use of machinery for work related tasks including: - soil and seedbed preparation - weed control - disease control - direct seeding - fertiliser and nutrient application - transplanting - irrigation.</td>
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<td>1.3</td>
<td>OHS hazards are identified, risks assessed and reported to the supervisor.</td>
<td>What OHS hazards may be associated with crop establishment? Hazards may include the use of machinery, moving machinery and machinery parts, falling trees and plant debris, chemicals and hazardous substances, manual handling, solar radiation, dust, and noise.</td>
<td>Learning experiences for the HSC must address: An awareness of potential hazards including: - physical - unsafe tools and equipment - uneven surfaces - fatigue - noise</td>
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| 1.4     | The **environmental implications** of the crop establishment program are identified and discussed with the supervisor. | | – dust  
– vehicles  
– exposed moving machinery parts  
– obstacles  
• biological  
– plant allergy  
– hazardous substances  
– insects  
– spiders  
– snakes  
• ergonomic  
– inappropriate use of tools/equipment  
– poor manual handling  
• environmental  
– climate  
– solar radiation  
• psychological  
– dealing with emergencies  
– working alone  
– isolation.  
A basic understanding of risk assessment:  
• identify hazards  
• assess associated risks  
• strategies to control/eliminate risks. |
|         | What are the **environmental implications** associated with crop establishment?  
Negative environmental implications may include the contamination of off-site ground water or soils from solids, debris, nutrients or chemicals; land disturbance, spread of noxious weeds, and water run-off. | | |
|         | **Learning experiences for the HSC must address:**  
Environmental implications associated with crop establishment programs including:  
• negative environmental implications  
  – contamination of the off-site ground water or soils from solids, debris, nutrients or chemicals  
  – land disturbance resulting in erosion  
  – spread of noxious weeds  
  – water run-off  
• soil structure degradation  
• positive environmental implications  
  – soil structure improvement  
  – sustainable food production. | | |
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<td>1.5</td>
<td>Suitable personal protective equipment (PPE) is selected, used and maintained.</td>
<td>What PPE may be required to undertake horticultural crop establishment work? PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, hearing protection, sunscreen lotion and hardhat.</td>
<td>Learning experiences for the HSC must address: The selection, use, maintenance and storage of personal protective equipment (PPE) appropriate to the work task including: • footwear • head protection – hard hat, sun hat and helmet • overalls • gloves • apron • respirator • face mask • hearing protection • eye protection – goggles, safety glasses and face guard • sunscreen • waterproof clothing.</td>
</tr>
<tr>
<td>2 Prepare the site for planting</td>
<td>2.1 Old crop and other waste materials are removed and disposed of in full consideration of environmental implications.</td>
<td>How may the waste materials be disposed of? Waste disposal may include disinfection, ploughing organic waste into the soil, mulching or composting of plant material, bagging and removal of seed heads, and disposing of noxious or poisonous material at approved disposal sights.</td>
<td>Learning experiences for the HSC must address: Environmentally sound waste disposal methods including: • disinfections • ploughing organic waste into the soil • mulching or composting of plant material • bagging and removal of seed heads • disposal of noxious or poisonous material at approved disposal sights.</td>
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<tr>
<td>2.2</td>
<td>Where soil is the growing media, samples are taken for testing according to established industry procedures.</td>
<td>What tests may be carried out on soil samples? Tests may include pH, salinity, water repellence, slaking, proportion of organic matter.</td>
<td>Learning experiences for the HSC must address: Soil sample testing including: • pH • electrical conductivity • soil stability • macro-nutrients • micro-nutrients • exchangeable cations.</td>
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<tr>
<td>2.3</td>
<td>Where soil is the growing media, soil treatment/amendments are applied according to soil test results and supervisors instructions.</td>
<td>What soil treatments/amendments may apply to this standard? Soil treatments/amendments may include gypsum, organic matter, artificial fertilisers or</td>
<td>Learning experiences for the HSC must address: Applying soil treatments/amendments according to soil test results instructions including: • adding gypsum to correct soil structure</td>
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| 2.4     | Growing media is prepared according to the crop establishment plan. | the planting of a temporary or permanent cover crop. It does not include fumigation as this has a licensing requirement in some States. | • adding lime/dolomite to correct soil pH  
• adding organic matter to improve soil structure and soil buffering capacity  
• using artificial fertilisers to improve soil fertility  
• planting a cover crop to add organic matter and improve soil structure. |

**2.4 Growing media is prepared according to the crop establishment plan.**

Learning experiences for the HSC must address:
Preparation of plant growing media including:
- sufficient stability to hold plants  
- minimal shrinkage  
- adequate moisture retention  
- free draining  
- weed and disease free  
- sterilised.

2.5 Crop protection is implemented according to enterprise guidelines.

Learning experiences for the HSC must address:
The implementation of crop protection according to enterprise guidelines including:
- wind protection  
  - cover crops  
  - artificial structures  
  - shelter belts  
- trellises and stakes  
- mulch  
- plastic  
- frost protection  
  - water applications  
  - air disturbance  
  - smudge pots  
- pest and disease control.

What type of **crop protection** may be required for crop establishment?  
Crop protection may include wind protection such as artificial structures, permanent shelter belts or temporary plantings of cereals, bana grass or sudax; trellises and stakes; and mulch, including straw, plastic, cover crop or any vegetative material.

2.6 The planting pattern is marked out according to the crop establishment plan.

Learning experiences for the HSC must address:
The calculation of spacings and planting patterns according to the crop establishment plan.
Marking out and spacing equipment.
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<tr>
<td>2.7</td>
<td>Machinery, equipment and tools are operated according to enterprise guidelines.</td>
<td>What machinery, equipment and tools are likely to be used for plant maintenance? Machinery, equipment and tools may include tractors, rotary hoes, cultivators, fertiliser spreaders, surveying and measuring equipment, seeding or planting machinery. What OHS hazards may be associated with crop establishment? Hazards may include the use of machinery, moving machinery and machinery parts, falling trees and plant debris, chemicals and hazardous substances, manual handling, solar radiation, dust, and noise. What PPE may be required to undertake horticultural crop establishment work? PPE may include hat, boots, overalls, gloves, goggles, respirator or face mask, hearing protection, sunscreen lotion and hardhat.</td>
<td>Learning experiences for the HSC must address: The operation of machinery, equipment and tools according to enterprise guidelines including: • calibrate equipment • routine maintenance checks • correct clean-up and storage procedures • correct PPE.</td>
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<tr>
<td>3</td>
<td>Carry out planting operations</td>
<td>3.1 Planting material is selected according to the type of crop and enterprise quality standards.</td>
<td>What types of planting material may be used to establish a crop? Planting material may include seeds, seedlings, runners, cuttings or bare rooted trees.</td>
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<td>3.2 Planting material is treated according to the crop and supervisors instructions.</td>
<td>How might planting material be treated before planting? Pre-plant treatments may include fungicide dips, fungicide dusts for seeds, root trimming, shoot trimming, crown gall dips and anti-transpirants.</td>
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<td>3.3</td>
<td>Planting material, waiting to be planted is <strong>maintained</strong> under conditions that will ensure maximum viability.</td>
<td>How might planting material be <strong>maintained</strong> while waiting to be planted? Maintaining plants may include keeping seeds and tubers dry and cool, keeping plants and plantlets cool and moist to prevent dehydration.</td>
<td><strong>Learning experiences for the HSC must address:</strong> Maintenance of planting materials prior to planting including: • keeping seeds and tubers dry and cool • keeping plants and plantlets cool and moist to prevent dehydration.</td>
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<td>3.4</td>
<td>Planting material is handled and transported to the site with no signs of transport damage.</td>
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<td><strong>Learning experiences for the HSC must address:</strong> Signs of transport damage including: • wilting from dehydration • breakage of growing tips • root damage • leaf damage.</td>
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<tr>
<td>3.5</td>
<td>Planting is carried out according to the planting plan.</td>
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<td>4</td>
<td><strong>Care for young plants</strong></td>
<td></td>
<td><strong>Learning experiences for the HSC must address:</strong> A basic understanding the purpose of treatments to plantings including: • insecticides • miticides • fungicides • herbicides • frost • fertilisers • mulch.</td>
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<tr>
<td>4.1</td>
<td><strong>Treatments</strong> are applied to plantings according to the supervisors instructions.</td>
<td>What <strong>treatments</strong> may apply to the care of young plants? Treatments may include pest and disease prevention and control, weed prevention and control, frost, fertilisers, and mulch.</td>
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<td>4.2</td>
<td><strong>Water is applied</strong> to plantings according to the irrigation schedule and established sustainable farming practices.</td>
<td>How may <strong>water be applied</strong> to plants? Water may be applied using irrigation systems, which may include drips; overheads, central pivot, micro irrigation, under tree, and flood.</td>
<td><strong>Learning experiences for the HSC must address:</strong> An awareness of a range of irrigation systems including: • drip • overheads • central pivot • micro-irrigation • undertree • flood.</td>
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<td>4.3</td>
<td>Plantings are trained according to the supervisors directions.</td>
<td>In what way may plants be trained? Training may involve thinning, trimming, staking or trellising.</td>
<td>Learning experiences for the HSC must address: An understanding of methods for training plantings and their purpose including: • thinning • trimming • staking • trellising.</td>
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**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 **communication of ideas and information** (1) be applied? Ideas and information relating to preparation, planting and crop care, and problems encountered should be discussed with other members of the work team and the supervisor.

2. How can **information be collected, analysed and organised (1)**? Enterprise work procedures, such as a daily planting plan, mulching, fertilising and water requirements of crops, should be consulted, interpreted and applied to crop establishment activities with further clarification sought from the supervisor where necessary.

3. How are **activities planned and organised (1)**? Materials, tools, equipment and work activities for crop establishment routines may need to be arranged around seasonal requirements, and there may be some responsibility for co-ordinating work activities with other members of the work team.

4. How can **team work (1)** be applied? Crop establishment activities may involve working with other members of a team to complete operations within the daily work routine.

5. How can the use of **mathematical ideas and techniques (1)** be applied? Calibrating spray equipment and determining quantities and application rates for treatment. Fertiliser or mulching of crops will require mathematical application.

6. How can **problem-solving skills (1)** be applied? Problems relating to site preparation, crop planting, treatments, watering, machinery and equipment, workplace safety, and other team members may arise during the establishment of crops, which may require problem-solving skills.

7. How can the use of **technology (1)** be applied? Technology may be applied in the preparation, use and maintenance of horticultural equipment and machinery used for spreading of fertiliser or other crop treatments.