



ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Curriculum Standard

Horticultural Technician

Level 1 and 2

Trade Code: 441C

Date: 2009

Please Note: Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the *Trades Qualification and Apprenticeship Act* (TQAA) or the *Apprenticeship and Certification Act, 1998* (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the *Ontario College of Trades and Apprenticeship Act, 2009* (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (<http://www.collegeoftrades.ca>) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: <http://www.collegeoftrades.ca/about/legislation-and-regulations>

Table of Contents

Introduction 1

Program Summary of Reportable Subjects.....2

Evaluation and Testing4

S0561 Workplace Safety 5

S0562 Workplace Communications 9

S0563 Plant Science 12

S0564 Turf Management 1 15

S0565 Plant Identification 1 18

S0566 Plant Materials 1 20

S0567 Trade Calculations 24

S0568 Landscape Construction 1 26

S0569 Integrated Pest Management and Plant Health Care 31

S0570 Landscape Equipment Maintenance 35

S0571 First Aid and CPR Training 37

S0572 Plant Propagation 38

S0573 Plant Production 42

S0574 Irrigation 45

S0575 Turf Management 2 48

S0576 Plant Identification 2 53

S0577 Plant Materials 2 55

S0578 Site Layout, Grading and Surveying 58

S0579 Landscape Construction 2 61

S0580 Plan Reading and Quantity, Take off and Quote Preparation 67

INTRODUCTION

This Curriculum Standard has been developed in keeping with the related Ministry of Training, Colleges and Universities (MTCU) Training Standard. The Curriculum Standard provides a standard of theoretical knowledge and practical application to complement the on-the-job experiences of apprentices.

The design of the Curriculum Standard facilitates cross-referencing between in-school learning outcomes and related workplace performance objectives as defined in the Training Standard for the trade. Apprentices, therefore, are expected to complete the learning associated with these objectives by applying the prescribed in-school knowledge to the required practical experiences in the work setting.

Innovation and the use of complex equipment in trades are resulting in increasing demands for tradespersons who are not only skilled in the practical aspects of the trade, but who also have a sound theoretical knowledge.

The objectives of the curriculum standard, therefore, are to provide a basis for:

1. Sound theoretical training to meet the challenges presented by innovation and increasingly complex tools and equipment within the work environment.
2. Reinforcement of fundamental proficiency in the trade through the practice of work skills as identified in specific Learning Outcomes.
3. Developing high standard of trade craftsmanship and problem-solving skills.
4. Developing a desirable work attitude and a keen sense of responsibility, particularly concerning public and personal safety.

To assure maximum consistency in delivery, a time allocation has been included for each reportable subject, along with a theoretical and practical breakdown of the Learning contents.

While setting out content requirements as determined by the Industry Committee and as prescribed in the Acts and Regulations for the trades, the curriculum standard has been designed to give the instructor every reasonable opportunity for flexibility and innovation in curriculum development, lesson planning and delivery.

In all practical learning activities, the apprentices will abide by the Occupational Health and Safety Act and all other regulations and policies relating to safety, particularly the use of personal protective equipment.

Program Summary

Reportable Subject	Duration (Hours)			Prerequisite
	Theory	Application	Total	
LEVEL 1: 12 weeks				
S0561 - Workplace Safety	24	0	24	-
S0562 - Workplace Communications	24	0	24	-
S0563 - Plant Science	24	24	48	-
S0564 - Turf Management 1	27	9	36	-
S0565 - Plant Identification 1	18	18	36	-
S0566 - Plant Materials 1	20	10	30	-
S0567 - Trade Calculations	24	0	24	-
S0568 - Landscape Construction 1	8	44	52	-
S0569 - Integrated Pest Management and Plant Health Care	36	12	48	-
S0570 - Landscape Equipment Maintenance	6	18	24	-
S0571- First Aid and CPR Training	8	6	14	-
Sub-Total	219	141	360	

LEVEL 2: 12 weeks				
S0572 - Plant Propagation	12	36	48	3, 6
S0573 - Plant Production	24	24	48	3, 6
S0574 - Irrigation	12	12	24	3, 4, 6
S0575 - Turf Management 2	24	12	36	4
S0576 - Plant Identification	18	18	36	5
S0577 - Plant Materials 2	12	12	24	6
S0578- Site Layout, Grading and Surveying	18	18	36	7
S0579- Landscape Construction 2	24	60	84	8
S0580 - Plan Reading And Quantity Take-off, Quote Preparation	12	12	24	7
Sub-Total	156	204	360	
TOTAL (Basic and Advanced)	375	345	720	

Evaluation and Testing

The method of evaluation and/or testing may vary significantly from reportable subject to reportable subject. Evaluations should attempt to assess the level of practical skill possessed by each apprentice. Other forms of evaluation may include case studies, short answer and identification questions, where applicable. In most cases, questions requiring long, or essay-type written answers should be avoided.

Frequency of testing will also depend upon the materials being covered. Generally, evaluations should be carried out at the end of each learning unit. Weekly testing is recommended for material involving major memory recall, such as plant identification. In all cases, evaluations should tend to be short and frequent, as opposed to the one major test or evaluation at the end of the course of study.

Number: **S0561**

Title: **Workplace Safety**

Duration: 24 Hours Total

Theory: 24 Hours Practical: 0 hours

Prerequisites: N A

Cross-reference to training standard: 6621.01 to 6621.17

GENERAL LEARNING OUTCOME

Describe and demonstrate safe workplace practices including dealing with on-site conditions, emergencies and hazards, according to federal and provincial pertinent safety legislation and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

- S0561.1.1 Describe the requirements pertaining to workplace safety legislation and regulations.
- Ontario Health and Safety Act (OHSA)
 - Workplace Hazardous Materials Information System (WHMIS)
 - Canadian Standards Association (CSA)
 - Construction Safety Act
 - Ministry of Labour (MOL)
 - Ministry of Environment (MOE)
 - Workplace Safety and Insurance Board (WSIB)
 - Technical Safety Standards Association (TSSA)
 - Ontario Regional Common Ground Alliance (ORCGA)
 - Bill C45
 - Ministry of Transportation (MTO)
 - Required documentation
 - Employer policy manual
 - Roles and Responsibilities
 - On – site requirements

S0561.1.2 Describe and demonstrate PPE (Personal Protective Equipment) use in the horticultural workplace (eye, head, hearing, breathing, hand, foot protection and clothing)

- eye wear
 - types
 - adjustment and fitting
 - maintenance
- head wear
 - types
 - adjustment and fitting
 - maintenance
- hearing protection
 - types
 - adjustment and fitting
 - maintenance
- breathing equipment
 - types and uses
 - cartridge-type respiratory protection
 - self contained breathing apparatus
 - dust masks
 - hepa filters
 - expiration dates
 - adjustment and fitting
 - maintenance
- hand protection
 - types
 - maintenance
 - fitting
- foot wear
 - types
 - maintenance
 - fitting
- clothing requirements
 - maintenance
 - fitting
 - seasonal clothing

S0561.1.3 Describe pedestrian and vehicular job site traffic control.

- traffic control devices and signs
- pedestrian access to site
- safety lanes around equipment
- standard hand signals and methods
Highway Traffic Act (Field Book 7)

- S0561.1.4 Describe requirements for safe workplace performance.
- handling tools, equipment and materials.
 - governing legislation
 - according to manufacturers' operators manuals and specifications
 - inspection of operating condition (hand tools)
 - prevention practices
 - safe lifting
 - WHMIS (safe material handling)
 - PPE
 - mount and dismount equipment.
 - working safely around operating equipment.
 - warning signals/alarms
 - visible presence
 - safe distances
 - hand signal communication
 - lock out/tag out
 - locating utilities
 - gas
 - hydro
 - water
 - telephone
 - cable
 - source of hazard
 - electrical limits of approach
 - fibre optics
 - One – Call Service and interpret locate plans and marker colours
 - irrigation systems
- S0561.1.5 Identify and describe the impact of climatic extremes on workplace safety and performance.
- appropriate dress
 - climatic extremes
 - wind
 - sun – Ultra violet rays and the hazards
 - temperature – heat alerts, individual workplace policies
 - precipitation
 - slip and falls
 - Air Quality Index (Smog)
 - lightning
 - employees rights and responsibilities to complete work safely
 - precautions to take
 - right to decline
 - materials/equipment protection (sensitivity to climatic extremes)

- S0561.1.6 Explain Emergency Response best practices.
- emergency response policy (site, place of business)
 - safety of self and others
 - Securing site
 - first aid/CPR usage
 - emergency services
 - fire
 - ambulance
 - police
 - poison control centres
 - MOE / Spill Response
 - MOL

Evaluation Methods:

Progressive written testing/case studies/practical demonstration

Number: **S0562**

Title: **Workplace Communications**

Duration: 24 Hours Total

Theory: 24Hours Practical: 0 hours

Prerequisites: N A

Cross-reference to training standard: 6622.01 to 6622.08

GENERAL LEARNING OUTCOME

Describe and demonstrate oral, written communication skills required to function effectively as part of a crew/team in the workplace, using traditional and current technology.

LEARNING OUTCOMES AND CONTENTS

S0562.2.1 Define and describe use of effective writing skills.

- grammar
 - sentence structure
 - punctuation
- handwriting legibility
- word processing
 - electronic operation including e-mail use and etiquette and protocol
 - word processing software
- clear and concise contents – i.e. on the job note taking, IPM inspection, customer concerns etc.
- critical data/ idea identification
- typical forms:
 - time-sheets
 - daily logs
 - accident/incident reports
 - requisitions
 - letters and memos.
 - employer reports and record keeping

S0562.2.2 Describe and demonstrate literacy skills.

- demonstrate understanding of job description and specifications
 - definition of terms
 - contents divisions
- work orders
 - requirements

- component tasks
- safety considerations
- packing slips and bills of lading
- tender/quotation packages
- company memos and manuals
- government publications
- manufacturers' documentation (Product labels and Material Safety Data Sheets (MSDS))
- develop career portfolios i.e. photos, certificates, projects to encapsulate both work and academic experience

S0562.2.3 Describe and demonstrate effective listening skills.

- Hearing
 - note taking
 - interpreting/following directions
 - customer questions
 - main idea/components
- course of action selection
 - safe, efficient and effective performance
 - feedback (written follow through as required).
- telephone etiquette

S0562.2.4 Describe and demonstrate verbal communication.

- give directions/responses
 - clear enunciation
 - accurate speech
 - coherence
 - proper language and etiquette
- resultant response/action

S0562.2.5 Describe and demonstrate required workplace problem solving techniques.

- identification
- main issue/challenge
- question/additional input
 - questioning techniques
 - response interpretation
 - reading between the lines
- data collection/research
 - horticultural references
 - accessing the internet/world wide web
 - other sources
- alternative solutions
- recommended course of action
 - evaluation/combination of alternatives

- S0562.2.6 Describe and demonstrate required cooperation and teamwork strategies
- recognition of peoples' diversity
 - acknowledgement of individual differences
 - acceptance of responsibility for self and others
 - group decision-making
 - effective team member
 - acceptance of group actions
 - group mobilization
 - taking initiative/leadership
- S0562.2.7 Describe and demonstrate effective goal setting in the workplace
- establish clear, concise and achievable goals
 - create effective time management strategies
 - learning strategies and training plans
 - educational and career development opportunities
 - recognize personal limitations
 - budgeting skills
- S0562.2.8 Explain responsible work ethics and practices.
- company policy example i.e. Human Resource plans
 - standards of behavior
 - code of ethics
 - ethical use of technology such as internet, cell phones etc.
 - acceptance of responsibility
 - for one's actions
 - for personal decisions and choices
 - give and accept constructive feedback

Number: **S0563**

Title: **Plant Science**

Duration: 48 Hours Total

Theory: 24 Hours Practical: 24 hours

Prerequisites: N A

Cross-reference to training standard: 6623.07, 6623.10, 6625.04, 6625.05, 6625.01 to 6625.08, 6626.01, 6626.03 to 6626.07, 6630.01 to 6630.05, and 6631.01

GENERAL LEARNING OUTCOME

Describe plant biology, soil structure and quality, plant-media relationship, nutrient composition and the relationship to plant performance in it's environment.

LEARNING OUTCOMES AND CONTENTS

S0563.31 Identify and describe the structure and functions of the main organs of plants.

- leaves
- stems
- roots
- modifications
 - bulbs, tubers, rhizomes
- flowers
- fruits
- seeds
- the plant as a system
 - interrelationship of plant parts
 - photosynthesis
 - respiration
 - transpiration

S0563.3.2 Describe the impact of environmental change on plant growth and health.

- temperature variation
- growing medium conditions
 - micro-climate impact
- carbon dioxide
- oxygen
- humidity
- light
- water

- physiological disorders – sun, pollution, moisture levels, compaction

S05633.3 Determine soil and soil-less media quality and water quality for plant growing purposes.

- soil/soilless
 - types and textures and classes
 - drainage characteristics
 - aeration/porosity
 - water retention/percolation
- soil compaction

S0563.3.4 Sample and explain media analysis results (tissue, soil, soilless media, water)

- soil sampling
 - soil probe
 - sample locations
- soil, soilless, water, testing
 - soil test kits/labs
 - pH
 - nutrient exchange(cation/CEC's)
 - soluble salts
- test results
 - interpretation
 - recognize deficiencies

S0563.3.5 Determine nutrient deficiencies in plant and describe appropriate solutions.

- stage of growth
- plant health
 - essential elements and functions (macro- and micro-nutrients)
 - form of nutrient available to plant and nutrient mobility in soil/plant
- tissue sampling
- recognize impact of macro and micro nutrients on plant health and IPM
- organic/inorganic nutrient sources and action plans as related to media testing
- test results: implementation plan

S0563.3.6 Select and describe the application of soil amendments including nutrients for plants

- plant cultural requirements
- site limitations, conditions and uses
- soil structure, texture and analysis

- possible amendment formulations
- application / incorporation practices
- nutrient recycling(compost, water, green manures, turf clippings)
test results: implementation plan
- fertilizer formulations (organic/inorganic) plant nutrient requirements
 - nutrient deficiencies
 - macro and micro nutrients
 - fertilizer type and formulation

S0563.3.7 Describe how to monitor effectiveness of fertilizer applications.

- inspection of planting area
- plant condition
- growing media conditions
- re-evaluate plant health strategies based on treatment results

Evaluation Methods:

Ongoing written assessment: lab exercises, case studies, identification testing

Number: **S0564**

Title: **Turf Management 1**

Duration: 36 Hours Total

Theory: 27 Hours Practical: 9 hours

Prerequisites: N A

Cross-reference to training standard: 6631.01 – 6631.14, 6632.02 – 6632.07

GENERAL LEARNING OUTCOME

Describe and demonstrate turf grass mowing and fertilizing practices including monitoring turf grass quality, plant health care, and Integrated Pest Management (IPM) techniques, according to federal, provincial and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

S0564.4.1 Identify turf grass species, growth habit and species selection based on environment

- physiology of turf grass plant
- turf grass identification
 - common turf grass species
 - growth habits
 - shade/sun
 - use/application based on environment

S0564.4.2 Describe benefits of healthy turf grass in the environment

- carbon sequestration
- oxygen production
- soil erosion
- pollution abatement (noise/dust)
- climate Cooling
- aesthetic value and versatility
- use and function

S0564.4.3 Describe turf grass maintenance practices and basics of plant health care and Integrated Pest Management.

- mowing requirements (low maintenance vs. formal)
- frequency of cut
 - site conditions (Irrigated vs. non-irrigated)
- re-locate portable obstacles (patio furniture, tee blocks)
 - quality/height of cut to maximize plant performance and

- weed reduction
- site size and intricacy
- mowing pattern/procedure determination
- compaction possibility
- site preparation /site inspection (debris removal)
- clippings mulching/removal
- overall cut evaluation
- edge trimming
 - method selection
 - portable obstacles (site features, plant material)
 - uniformity
- Site clean up
 - legal requirements
 - compostable/recyclable and disposal of materials
 - transportation
- final inspection
 - finished appearance/uniformity assessment
 - re-cutting/re-trimming necessity
 - portable obstruction replacement
- Plant Health Care:
- height and quality of cut (i.e. blade sharpness, height sufficient for weed suppression)
- turf stand colour and uniformity and density
- plant nutrient requirements
 - nutrient deficiencies
 - nitrogen, phosphorus and potash
- application methods
 - protective gear/clothing
 - weather conditions
 - equipment selection
 - calibration
 - fertilizer type and formulations (organic/inorganic)
 - application area (avoid impermeable surfaces)
 - follow-up
 - equipment cleaning and lubricating
 - Application rate and method (striping/burning)
- storage/disposal
 - government regulations
 - safety requirements
 - spent containers/packages
 - environmental considerations
 - safety of operation

- **Integrated Pest Management:**
 - identify existing and potential causes of plant injury (i.e. cause of brown patch), early identification focus.
 - what is the causal agent (insect, disease, cultural, mechanical)?
 - monitor pest populations
 - report and record pest problems
- inspection of area
- turf condition/site conditions
- growing media conditions
- record keeping
 - legibility
 - dates of application
 - treatment type and method
 - plant species/variety
 - weather conditions
 - determine thresholds/tolerance level per species and situation
 - develop Action Plan using appropriate control/management

S0564.4.4 Identify and demonstrate use of turf grass maintenance equipment and applications.

- equipment selection and adjustment
- daily equipment maintenance and use
 - Manufacturers' Operations Manual /Procedures
 - PPE
 - tune for optimum performance: sharpening, adjustment, cleaning, and lubrication
 - reporting of: failure/defects
- record keeping
 - equipment circle check / inspection(report completion)
 - site and weather conditions
 - equipment used
 - mowing patterns
 - procedure used (why, what, when, where, how)
 - operator/technician

Evaluation Methods:

Ongoing written testing and practical identification testing

Number: **S0565**

Title: **Plant Identification 1**

Duration: 36 Hours Total

Theory: 18 Hours Practical: 18 hours

Prerequisites: N A

Cross-reference to training standard: 6623.01, 6623.06, 6624.12, 6625.03, 6625.08, 6626.01, 6627.02, 6628.01, 6628.02, 6629.01, 6629.06, and 6630.01

GENERAL LEARNING OUTCOME

Identify 80 ornamental landscape plants (**See Ontario 2009 Plant List**), using the required nomenclature and stating the cultural requirements for each and identifying pests and diseases as they relate to plant selection.

LEARNING OUTCOMES AND CONTENTS

- S0565.5.1 Describe how to distinguish between different plant groups.
- woody trees, shrubs and vines
 - deciduous / conifers
 - broad-leafed evergreens
 - native/non-native
- S0565.5.2 Identify 80 ornamental landscape plants, using the International System of Plant Nomenclature. This list shall consist of a combination of common ornamental landscape plants used in Ontario
- family
 - genus
 - species (specific epithet)
 - forma/variety/cultivar
 - common names
- S0565.5.3 Describe the key identification characteristics of the 80 ornamental landscape plants.
- leaves/needles
 - flowers/fruits/seeds
 - buds
 - bark
 - growth habit /form

S0565.5.4 Explain the cultural requirements of the 80 ornamental landscape plants identified. Describe common pest problems associated with these plants.

- moisture
- light
- soil type
- hardiness (climatic zones)
- pH/ nutrient requirements
- pruning/dead heading
- cultivation
- common pests

S0565.5.5 State the potential landscape uses for the 80 ornamental landscape plants identified.

- plant-specific uses
- residential applications
- commercial/institutional/industrial applications
- environmental impact
 - creation of specific environments (microclimates)
- siting

Evaluation Methods:

Ongoing written identification testing.

Number: **S0566**

Title: **Plant Materials 1**

Duration: 30 Hours Total

Theory: 20 Hours Practical: 10 hours

Prerequisites: N A

Cross-reference to training standard: 6624.06-6624.07, 6624.09-6623.11, 6624.13 - 6624.16, 6625.01 - 6625.11

GENERAL LEARNING OUTCOME

Describe grounds maintenance practices and procedures including basic installation and transplanting processes for nursery stock, such as annuals, woody and herbaceous plants, according to respective federal, provincial, and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

S0566.6.1 Describe on-site receiving and storage methods for plant materials prior to installation.

- plant condition
- inventory check
- phytosanitation Certificate
- site conditions
- storage methods
- plant cultural requirements
- site security

S0566.6.2 Describe, in detail, all processes and fundamentals of woody, herbaceous and annual plant installation and transplantation.

- standard details
 - plant size and condition
- planting site suitability
 - sun and wind exposure/weather
 - site conditions
 - locates
 - water availability
 - growing medium quality
 - site accessibility
- tools, equipment and supplies.
 - tool selection and use
 - materials required

- transportation logistics
- safety equipment
- planting site preparation
 - equipment selection and use
 - excavation
 - planting pit dimensions
- planting bed preparation
 - soil tilling
 - soil amendments
 - weeds, debris and garbage removal
 - bed edging
 - bed cultivation
 - soil amendment
 - materials handling
 - drainage provision
- plant material installation
 - plant placement
- removal/loosening of root containment
 - container grown/field grown/ball and burlap, fibre pot, wire basket, bare root
 - scarify root zone
- soil amendment
 - backfilling
 - mulching
- after planting care
 - irrigation
 - pruning
 - fertilizer
 - protection
 - guying/plant stabilization
- production: potting and transplanting
 - plans and specifications
 - bed layout
 - potting procedures
 - plant preparation
 - planting holes
 - plant installation
 - fertilizers
- irrigation
 - water source
 - production irrigation equipment/systems operation

S05666.3 Describe, in detail, garden and grounds maintenance practices and procedures relating to woody, herbaceous and annual plants.

- tools and equipment
- safety requirements

- top dressing
- weeding
- thinning
- soil cultivation
- plant staking
- raking
- edging
- basic pruning according to the principles of pruning (Royal Horticultural Society)
 - removal of dead/dying plant parts
 - plant shaping/shearing
- mulching
- irrigation
 - soil moisture contents
 - application
- soil sampling
 - nutrient deficiencies/recommendations
- pest/disease symptoms
- spring clean-up
- garden winterization
 - plant hardiness
 - environmental conditions
 - methods of protection
 - wrapping/screening/tying
 - rodent/wild life protection
 - removal of annuals
 - preparation of perennials
 - bed cleaning
 - delicate materials
 - rose hilling
- hard surfaces
 - need for repair
 - modular units re-installation
 - blowers
 - surfaces cleaning
 - adhesive and joint sand repairs

S0566.6.4 Describe recycling and disposal methods for excess/waste materials according to federal, provincial and municipal requirements.

- governing legislation
- consideration of environmentally sustainable best practices
- identification/separation of materials
 - hazardous materials
- disposal methods
- recycling methods/composting
- re-useable materials

- transportation of materials

S0566.6.5 Explain correct cleaning and maintenance of tools and equipment.

- according to manufacturers' specifications
- preventative maintenance
- safety inspections (circle checks)
- hazardous materials handling
- leaning and sharpening
- minor repairs
- operational testing
- damage/failure reporting
- winterizing
- storage

S0566.6.6 Describe respective federal, provincial, and municipal legal requirements as they relate to grounds maintenance and plant installation.

- traffic plans
- safe offloading
- parking permits
- locates
- phytosanitation certificates
- disposal and recycling
- pruning permits
- tree Removal permits
- by-laws

Evaluation Methods:

Written assignments and testing, and practical evaluation.

Number: **S0567**

Title: **Trade Calculations**

Duration: 24 Hours Total

Theory: 24 Hours Practical: 0 Hours

Prerequisites: N A

Cross-reference to training standard: 6623.04, 6631.02, 6632.01, 6633.01, 6634.01, 6635.01, 6636.01, 6637.01

GENERAL LEARNING OUTCOME

Identify, explain and demonstrate performance of calculations used in the horticulture industry, including the use of standard measuring devices.

LEARNING OUTCOMES AND CONTENTS

S0566.7.1 Perform linear, area and volume calculations in both imperial and metric systems of measurement.

- calculator usage
- exponential notation
- percentage calculations
- ratios
- linear measurement
 - formula
 - Pythagorean Theorem
 - 3-4-5 triangle
- area measurement
 - formula
- volume measurement
 - formula
- systems of measurement
 - metric
 - FPS (Imperial)
 - decimal feet
 - system conversions

S0566.7.2 Describe and demonstrate the use of measuring devices employed in the horticulture industry.

- tape measures
- rulers

S0566.7.3 Explain the importance of and demonstrate how to calculate basic quantities required for safe, efficient and productive job performance.

- pest control calculations
 - application areas
 - active ingredient
 - product quantities
 - application rates

Evaluation Methods:

Ongoing written and practical testing.

Number: **S0568**

Title: **Landscape Construction 1**

Duration: 52 Hours Total

Theory: 8 Hours Practical: 44 Hours

Co-prerequisites: S0561

Cross-reference to training standard: 6634.03 - 6634.08, 6634.10 - 6634.16, 6635.03 - 6635.09, 6637.03 - 6637.08, 6637.12 - 6637.15, 6637.17 - 6637.20

GENERAL LEARNING OUTCOME

Describe and demonstrate the handling and installation of precast landscape paving, wall units and landscape timber wall components, according to pertinent safety legislation and safe workplace practices, municipal standards and codes.

LEARNING OUTCOMES AND CONTENTS

- S0568.8.1 Describe the requirements of pertinent legislation and regulations including federal, provincial and municipal legal requirements and industry standards.
- Ontario Health and Safety Act (OHSA)
 - Workplace Hazardous Materials Information System (WHMIS)
 - Canadian Standards Association
 - Construction Safety Act
 - Ministry of Labour (MOL)
 - Ministry of Environment (MOE)
 - Workplace Safety and Insurance Board (WSIB)
 - Technical Safety Standards Association (TSSA)
 - Ontario Regional Common Ground Alliance (ORCGA)
 - Bill C45
 - Ministry of Transportation (MTO)
 - Required documentation
 - Employer policy manual
 - Certified Horticultural Technician and Certificate of Qualification
- S0568.8.2 Select and describe tools and equipment for preparation and installation of precast concrete landscape paving, wall units and timber wall components.
- site conditions
 - job size
 - site accessibility/terrain

- awareness of environmental sensitivity/concerns
- power source availability
- scope of work
- manual equipment
 - mallets and hammers
 - chisels
 - handsaws
 - levels
 - stakes
 - hand tamper
 - string lines
 - screeding boards, rakes and rails
- power equipment
 - power saws
 - power hammers
 - vibra-plate compactors
 - augers
 - sprayers
- PPE

S0568.8.3 Verify material suitability for use/application on the work site.

- plan and specification requirements
- packing/shipping documents vs. specifications
- types of materials
- quality of materials
- size/dimension of materials
- quantity of materials

S0568.8.4 Describe and demonstrate sub-grade and base preparation for installation of landscape paving, wall units and timber wall components.

- plan and specification requirements
- PPE
- equipment operation
- excavation
 - topsoil conservation
 - subsoil
 - shoring for safety and temporary retention
- sub-grade compaction
- drainage installation
 - pipes/tiles
 - stone, i.e. HPB, clear stone etc
- base materials placement
 - aggregates identification and use
 - concrete bases
- base materials compaction method
 - equipment

- monitoring

S0568.8.5 Describe and demonstrate installation of precast concrete landscape paving.

- unit types
 - manufacturers
 - paving stones finishes, shapes and colours
 - permeable pavers
 - specialty stones
- edging materials
 - PPE
 - cutting to length
 - placement
 - joining units
 - securing
- precast unit preparation
 - plan and specification requirements
 - equipment use
 - measuring
 - PPE
 - unit splitting
 - cutting to fit and to suit stone style
- precast stone placement
 - plan and specification requirements
 - manual placement
 - mechanical placement
 - PPE
 - surface slope joint treatment
 - granular materials (sand, polymeric sand, HPB etc)
 - adhesives
 - PPE
- surface compaction
 - equipment selection
 - PPE
 - monitoring density
- surface cleaning/finishing
 - plan and specification requirements
 - PPE
 - replacement of stones damaged during compacting
 - excess material removal
 - cleaning solutions
 - sealing/finishing solutions (taking care to prevent environmental contamination)

- site clean up
 - legal requirements
 - debris
 - compostable materials
 - re-usable materials
 - recyclable materials
 - hazardous materials
 - materials disposal
 - containment
 - transportation
- tools and equipment maintenance
 - manufacturers' specifications
 - inspection
 - PPE
 - cleaning
 - lubricating
 - defect/failure reporting

S0568.8.6 Describe and demonstrate the installation of landscape walls.

- unit types
 - manufacturers
 - wall types, finishes, shapes and colours (such as natural stone, timber, precast)
- base compaction
 - equipment selection
 - PPE
 - monitoring density
- unit preparation
 - plan and specification requirements
 - equipment use
 - measuring
 - PPE
 - unit splitting
 - cutting to fit and to suit stone style
 - facing of stone
- stone placement
 - plan and specification requirements
 - manual placement
 - mechanical placement
 - PPE
 - surface slope and wall batter
- joint treatment
 - granular materials (sand, soil, polymeric sand, HPB)
 - adhesives and mortar
 - PPE
- wall backfilling
 - geogrid and geotextiles

- plan and specification requirements
- aggregates (filling/compacting in layers)
- drainage systems
- PPE
- surface cleaning/finishing
 - plan and specification requirements
 - PPE
 - excess material removal
 - cleaning solutions
 - sealing/finishing solutions (taking care to prevent environmental contamination)
- site clean up
 - legal requirements
 - debris
 - compostable materials
 - re-usable materials
 - recyclable materials
 - hazardous materials
 - materials disposal
 - containment
 - transportation
- tools and equipment maintenance
 - manufacturers' specifications
 - inspection
 - PPE
 - cleaning
 - lubricating
 - defect/failure reporting

Evaluation Methods:

Ongoing written and practical assessment

Number: **S0569**

Title: **Integrated Pest* Management and Plant Health Care**

Duration: 48 Hours Total

Theory: 36 Hours Practical: 12 Hours

Prerequisites: N A

Cross-reference to training standard: 6623.01 to 6623.11

GENERAL LEARNING OUTCOME

Identify and describe management of pests and disorders of plant material (turf, trees, interior plants, greenhouse plants, perennial/annual), utilizing plant health care and integrated pest management principles.

LEARNING OUTCOMES AND CONTENTS

- S0569.9.10 Describe the importance and relevance of logs and records required by Integrated Pest Management prevention and treatments.
- S0569.9.1 Describe the concepts, benefits and components of an Integrated Pest Management Program and Plant Health Care.
- relationship of pest control and plant health
 - principles of a preventative pest management program
 - components of an IPM program
- S0569.9.2 Identify and describe the most common plants pests and disorders.
- horticultural references
 - government publications
 - insects
 - animal
 - weed
 - disorders
 - diseases
 - abiotic
 - invasive species/quarantinable pests
 - sampling contaminated materials
 - recognize and monitor signs and symptoms.
 - Record Keeping
- S0569.9.3 Identify and describe pest control measures, including

preventative/quarantine measures.

- references
 - government publications
 - package labels
- consider public safety
- plant/site conditions
- pest life cycles
- biological life cycles
- thresholds management
- solutions/control
 - cultural
 - manual/physical
 - bio-rational
 - biological/ chemical

S0569.9.4 Explain the term pesticide and relevant legislation pertaining to it.

- Federal/Provincial and regional legislation
- labeling
- classes of control products
- definitions and terminology
- environmental Protection(spill response, personal and public safety)

Provincial Definition: (**Need to cross reference with Health Canada's definition**)* Pesticide” means any organism, substance or thing that is manufactured, represented, sold or used as a means of directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling, any pest or of altering the growth, development or characteristics of any plant life that is not a pest and includes any organism, substance or thing registered under the Pest Control Act (PCPA, Canada)”

S0569.9.5 Select and describe appropriate methods of pest control according to IPM protocol and required equipment.

- consider public safety
- current government reference materials
- environmental protection considerations
 - prohibitive conditions
 - impact on success

S0569.9.6 Describe, in detail, pesticide treatment preparation, equipment calibration, and site preparation for pest control.

- posting and secure site for public safety
 - personal protective clothing and equipment
- supplier/manufacturers directions
 - labels
- environmental conditions
 - prohibitive conditions

- impact on success
- area of application
- calibration
 - test area
- mixing
 - measuring devices
- transportation/storage methods
- spills and emergency response
 - clean-up

- S0569.9.7 Describe, in detail, pest control treatment application techniques
- legal requirements
 - Site preparation (posting and secure site for safe operation and public safety)
 - personal protective clothing and equipment
 - time of application
 - environmental/ climatic conditions
 - product specific requirements(before/during/after application)
 - rate of application
 - application amounts
 - transportation/storage methods
 - spills and emergency response

- S0569.9.8 Describe maintenance of pest control application equipment.
- manufacturers' specifications
 - cleaning agents/rinse and disposal protocol
 - cleaning area/ site containment
 - spill kit protocol
 - safety requirements
 - safety (PPE)
 - environment considerations
 - transportation/storage methods
 - spills and emergency response

- S0569.9.9 Describe the handling and disposal of current and expired product and containers.
- legal requirements
 - manufacturers' specifications
 - transportation/storage methods
 - spills and emergency response
 - safety requirements
 - environmental stewardship
 - personal protective equipment
 - spent containers
 - damage/puncturing

- disposal methods

S0569.9.10 Describe the importance and relevance of logs and records required by Integrated Pest Management prevention and treatments

- information required
 - observations
 - time and date
 - location
 - site use (parkland, sports fields etc)
 - populations
 - thresholds
 - historical records
 - method and type of treatment (mechanical/ biological/ natural and synthetic products)
 - rate of application
 - species/variety treated
 - method of application
 - weather conditions
 - evaluation

Evaluation Methods:

Ongoing written and practical identification testing

Number: **S0570**

Title: **Landscape Equipment Maintenance**

Duration: 24 Hours Total

Theory: 6 Hours Practical: 18 Hours

Prerequisites: N A

Cross-reference to training standard: 6624.16, 6625.11, 6632.10, 6633.11, 6634.16, 6635.09, 6636.17, and 6637.20

GENERAL LEARNING OUTCOME

Describe and demonstrate basic scheduled, preventative and on-going maintenance procedures for powered horticultural equipment, according to respective federal, provincial and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

S0570.10.1 Describe the importance of performing basic scheduled and preventative maintenance of powered equipment used in the horticultural industry.

- basic internal combustion engine theory
- engine types
 - 2 cycle
 - 4 cycle
 - diesel
 - principles of operation
- manufacturers' specifications
 - operator's manuals
 - Operators log and scheduled maintenance program and documentation
- safety requirements
 - circle check/sign off
 - equipment logs and record keeping
- lubrication
 - lubricants
 - motor oils
 - greases
 - hydraulic oil
 - transmission/steering fluids
 - lubrication tools
 - general lubrication
 - grease fittings
 - check plugs/dipsticks

- fluid levels
- refueling procedures
 - gasoline
 - diesel
 - fuel mixes
- cleaning
 - washing
 - cleaning agents
 - air pressure
- filter elements
 - cleaning
 - replacement
- cutting blades
 - sharpening
 - replacement
 - balancing
 - vibration hazards
- operational testing
- damage/failure reports

S0570.10.2 Describe basic non-scheduled maintenance procedures of landscape horticultural powered equipment.

- condition monitoring/troubleshooting
- safety requirements
- tire/wheel changing
 - spares
 - jacks and lifts
 - equipment position and blocking
- immobilized/malfunctioning equipment (considering tag and lock out)
 - securing safety
 - minimizing damage
- component replacement
 - belts
 - hoses
 - propane tanks
 - cutting edges/blades
- sharpening
- tire pressures
- belt tensions
- failure/defect reporting
- winterization and storage

Evaluation Methods:

Ongoing written and practical assessment

Number: **S0571**

Title: **First Aid and CPR Training**

Duration: 14 Hours Total

Theory: 8 Hours Practical: 6 hours

Prerequisites: St. John's Ambulance, Red Cross, or equivalent (minimum 3 year cert.)

Cross-reference to training standard: U6621.17

GENERAL LEARNING OUTCOME

Describe the application of first aid and CPR techniques for emergencies in the workplace. This unit is comprised of the standard First Aid certification requirements.

LEARNING OUTCOMES AND CONTENTS

- S0571.11.1 Describe use of First Aid/CPR techniques to deal with on the job emergencies
- contents pre-determined by St. John's Ambulance or equivalent organization (minimum 3 year certificate)

Evaluation Methods:

First aid/ CPR testing.

Number: **S0572**

Title: **Plant Propagation**

Duration: 48 Hours Total

Theory: 12 Hours Practical: 36 hours

Prerequisites: 3.6

Cross-reference to training standard: 6628.01 – 6628.09

GENERAL LEARNING OUTCOME

Describe and demonstrate plant propagation by sexual and asexual methods.

LEARNING OUTCOMES AND CONTENTS

S0572.12.1 Select and describe suitable stock/parent plants for propagation purposes.

- horticultural references:
 - Plant Breeders rights and propagation licensing (COPF)
 - OMAFRA Publication 384
- stock/parent plant assessment and selection
 - pest free
 - true to type
 - condition

S0572.12.2 Select and describe appropriate propagation method including: division, grafting, budding, seeding, layering, stem cuttings, root cuttings, tissue culture

- based on plant type
- based on season
- based on propagation facilities, tools and equipment
- purpose of propagation

S0572.12.3 Describe preparation of propagation area

- assemble tools and supplies
 - sanitation of facility, tools, equipment and materials
- prepare facility to ensure correct environmental conditions:
 - temperature, light, humidity, air exchange
 - irrigation and drainage

S0572.12.4 Describe and demonstrate sexual and asexual propagation

- propagation by sexual methods,
 - reasons for propagation using seed
 - seed collection , extraction, and storage
 - seed preparation
 - after ripening, stratification treatments
 - pre-germination treatments, scarification , imbibitions
 - media selection or soil preparation for seeding
 - environmental conditions for successful germination
 - seed sowing techniques
 - integrated pest management for propagation by seeding
 - labeling and record keeping
- propagation by asexual methods including; budding and grafting, layering, divisions and offsets, root, stem and leaf cuttings, use of specialized vegetative parts such as bulbs, tubers, rhizomes and corms.
- reasons for propagation using asexual methods
- reasons for propagation by layering
- layering techniques, mound layering, stool beds, tip and serpentine layering, air layering
- environmental conditions for successful layering
- tools, materials, and facilities for layering
 - media selection or soil preparation for layering
 - integrated pest management for propagation by layering
 - labeling and record keeping
 - reasons for propagation by grafting and budding
 - environmental conditions for successful grafting and budding
 - tools, materials, and facilities for budding and grafting
 - effects of understock
 - understock selection and preparation
 - compatibility and delayed incompatibility
 - budding techniques; T-budding and Chip budding
 - common grafting techniques, cleft, veneer side, whip and tongue, splice, bridge,
 - integrated pest management for propagation by budding and grafting
 - labeling and record keeping
- reasons for propagation by stem, root or leaf cuttings
- techniques of propagation by stem cuttings, hardwood stem cuttings, semi-hardwood stem cuttings, softwood stem cuttings
- Plant Growth Regulators (PGR) and their role in propagation by stem, and leaf cuttings
- techniques of propagation by root cuttings
- techniques of propagation by leaf cuttings
- environmental conditions for successful propagation using stem,

- root , or leaf cuttings
- tools, materials, and facilities for propagation using stem, leaf and root cuttings
 - integrated pest management for propagation by stem, leaf and root cuttings
 - labeling and record keeping
- reasons for propagation using specialized plant parts such as bulbs, tubers, corms and rhizomes
 - re-production, collection and storage of specialized plant parts used for propagation
 - environmental conditions for successful propagation using specialized plant parts such as bulbs, tubers, corms and rhizomes
 - tools materials, and facilities for propagation using specialized plant parts such as bulbs, tubers, corms and rhizomes
 - techniques of propagation by specialized plant parts such as bulbs, tubers, corms and rhizomes
 - environmental conditions for successful propagation using specialized plant parts such as bulbs, tubers, corms and rhizomes
 - tools, materials, and facilities for propagation using bulbs, tubers, corms and rhizomes
 - integrated pest management for propagation by bulbs, tubers, corms and rhizomes
 - labeling and record keeping
- reasons for propagation using divisions and offsets
 - environmental conditions for successful propagation using divisions and offsets
 - tools materials, and facilities for propagation using divisions and offsets
 - techniques of propagation by divisions and offsets
 - environmental conditions for successful propagation using divisions and offsets
 - tools, materials, and facilities for propagation using divisions and offsets
 - integrated pest management for propagation by divisions and offsets
 - labeling and record keeping
- reasons for using micro propagation
 - environmental conditions for successful micro propagation
 - tools materials, and facilities using micro propagation
 - techniques of micro propagation
 - environmental conditions for successful micro propagation
 - tools, materials, and facilities for micro propagation
 - integrated pest management for micro propagation
 - labeling and record keeping

S0572.12.5 Describe preparation of progagules for growing on including: post operational maintenance, plant conditioning, record keeping and clean up.

- conditioning for growing-on
 - hardening-off
 - pruning , root pruning as required
 - nutrient management
 - plant growth regulators, anti – desiccants
- record keeping and labeling
- analyze propagation success
- clean up
 - recycle and dispose according to Federal, provincial and municipal legal requirements
 - work area cleaning
 - compostable materials

Evaluation Methods:

Ongoing written and practical assessment

Number: **S0573**

Title: **Plant Production**

Duration: 48 Hours Total

Theory: 24 Hours Practical: 24 hours

Prerequisites: 3, 6

Cross-reference to training standard: 6624.01 - 6624.03, 6629.01 – 6629.09

GENERAL LEARNING OUTCOME

Describe plant production from growing, potting/lining out to sale/installation on site, according to respective federal, provincial, and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

S0573.13.1 Describe the legislative and regulatory requirements for plant production, from potting/lining out to sale/installation on site.

- Phytosanitary best practices
- Nursery Certifications
- Quarantine/ Plant Movement Restrictions
- Canadian Food Inspection Agency Programs
- Ontario Health and Safety Act
- Workplace Hazardous Materials Information System (WHMIS)
- Canadian Standards Association
- Construction Safety Act
- Ministry of Labour (MOL)
- Ministry of Environment (MOE)
- Workplace Safety and Insurance Board (WSIB)
- Technical Safety Standards Association (TSSA)
- Ontario Regional Common Ground Alliance (ORCGA)
- Bill C45
- Ministry of Transportation (MTO)
- Required documentation
- Employer policy manual

S0573.13.2 Describe the root of propagated plants to production systems i.e. container, field production.

- post propagated plant care
- container production process techniques
- pot in pot
- field grown

- hydroponics
 - aquaculture
- S057.313.3 Describe planting site and growing media selection and preparation.
- plant type and growth requirements (horticultural references)
 - market specifications
 - equipment selection
 - container and media selection
 - sterilization
 - flat/bed preparation
 - drainage provision
 - media dampening
 - timing
 - pest, weed and disease control
- S0573.13.4 Describe, in detail, plant potting, lining out and planting operations, including follow-up maintenance.
- plant growth requirements/spacing
 - market specifications
 - timing of operation
 - method selection
 - equipment selection and preparation
 - labeling
 - irrigation
 - fertilizers/nutrient management
 - pests, disease and weed control
- S0573.13.5 Describe the preparation and harvest of nursery stock for market/installation, including storage/holding, clean up and record keeping procedures.
- preparation and harvest method
 - bare-root
 - balled and bur lapped
 - containerized/field potted/
 - pot in pot system
 - grow bags
 - staking, tying and wrapping
 - site factors
 - season
 - timing
 - plant size
 - tools and equipment
 - cultural requirements
 - top pruning
 - root pruning

- inventory control
- holding/storage environments
- clean up
 - legal requirements considering federal, provincial and local
 - work area cleaning
 - recyclable materials
 - materials for disposal
 - compostable materials
 - hazardous waste
 - storage containers
- production record keeping
 - legibility
 - production dates
 - plant species
 - quantities
 - methods used
 - success rates

S0573.13.6 Describe nursery stock grading procedures.

- nursery stock identification/ appropriate nomenclature
- Canadian Nursery Landscape Association specifications
- Perennial Plant Association Specifications
- customer requirements.
- materials labeling and preparation

Evaluation Methods:

Ongoing written and practical assessment

Number: **S0574**

Title: **Irrigation**

Duration: 24 Hours Total

Theory: 12 Hours Practical: 12 Hours

Prerequisites: 3, 4, 6

Cross-reference to training standard: 6627.01 – 6627.08, 6631.03, 6633.09

GENERAL LEARNING OUTCOME

Describe water quality, plant water requirements and local conservation standards, water stewardship principles, basic irrigation systems and procedures according to federal, provincial and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

- S0574.14.1 Explain the importance of determining the source quantity, and quality of water for irrigation purposes.
- source location and recovery rate of source
 - sample preparation
 - containers
 - water testing agencies and equipment
 - test results interpretation
 - legislation, water take permits and record keeping at source water usage reporting and documentation
- S0574.14.2 Describe irrigation procedures, methods and water stewardship practices.
- site assessment
 - turfgrass species
 - surface use
 - size
 - cultural requirements
 - root zone condition
 - methods of irrigation (soaking, syringe, drip, overhead, sprinkler)
 - hydraulics
 - pressure gain
 - flow
 - friction loss
 - back flow prevention
 - ET Management (Evapo- transpiration Principles)
 - equipment selection
 - equipment adjustment

- rates of irrigation (Manageable Allowed Depletion-MAD)
- time of irrigation (Disease Prevention)

S0574.14.3 Describe turf grass irrigation procedures and water stewardship practices

- subject plants identification
- site considerations i.e. wind and use
- equipment selection
- equipment calibration
- rate and time of application
- manual applications
- automatic applications
- stage of growth
- root system assessment
- soil/water relationship including wetting agents
- environmental and site conditions such as slope/exposure
- time of application
- rate of application
- duration of application

S0574.14.4 Describe irrigation procedures for various plant materials and water stewardship practices.

- subject plants identification
- plant specific requirements i.e. foliar vs. root
- equipment selection
- equipment calibration
- rate and time of application
 - manual applications
 - automatic applications
- stage of growth
- soil/water relationship including wetting agents
- environmental and site conditions such as slope/ exposure/direct and indirect planting applications
- time of application
- rate of application
- duration of application
- record keeping
 - legibility
 - dates
 - locations
 - methods used
 - plant species/variety
 - application rates
 - volumes
 - additives
 - permanent wilt point

- S0574.14.5 Describe the installation, use, maintenance and repair of irrigation equipment and systems in relation to water stewardship principles.
- manufacturers' specifications
 - system installation
 - equipment/systems testing
 - equipment/systems cleaning
 - system controls
 - timing
 - duration
 - sequence
 - monitoring performance
 - troubleshooting in-ground system problems
 - component identification
 - component testing
 - problem detection/isolation
 - system shut-down
 - component repair/replacement
 - fall shut-down
 - regulating legislation
 - system deactivation
 - clearing lines
 - spring start-up
 - winter damage
 - system activation
 - specified water flow rate

Evaluation Methods:

Ongoing written and practical assessment

Number: **S0575**

Title: **Turf Management 2**

Duration: 36 Hours Total

Theory: 24 Hours Practical: 12 Hours

Prerequisites: 4

Cross-reference to training standard: : 6633.04 – 6633.12

GENERAL LEARNING OUTCOME

Describe turf grass establishment and cultivation practices including monitoring turf grass quality, plant health care, and Integrated Pest Management (IPM) techniques used in landscape construction (Softscape Installation), and grounds/golf course maintenance operations, according to respective federal, provincial, and municipal legal requirements.

LEARNING OUTCOMES AND CONTENTS

- S0575.15.1 Describe, in detail, the establishment of a turf stands by seeding, hydro-seeding and sodding methods, including site preparation and clean up.
- plan and specification requirements
 - site assessment (soil analysis)
 - transportation and logistics
 - growing media preparation
 - weed management
 - soil amendments as required to amend soil structure
 - nutrient requirements based on soil analysis
 - seeding procedures
 - surface preparation
 - seed mix selection
 - application methods
 - equipment selection and calibration
 - soil contact
 - rolling
 - mulching
 - sodding procedures
 - method and sequence selection
 - equipment selection
 - small roll installation
 - large roll installation
 - cutting, fitting, and joints

- turf shrinkage/gaps
- rolling
- plug and core methods (Bent Grass application)
- turf establishment protection
 - sources of damage
 - protection materials
 - barriers/fencing
 - signage
- irrigation
 - method selection
 - equipment selection
 - duration/ rate of application/syringing
- site clean up
 - legal requirements
 - compostable materials
 - recyclable materials
 - materials for disposal
 - hazardous materials
 - storage containers
- establishment follow up procedures
 - client education on best establishment practices
 - monitor turf establishment
- record keeping
 - legibility
 - result monitoring
 - date of operation
 - turfgrass species
 - quantities used
 - method of installation
 - method of irrigation
 - success rate

S0575.15.2 Describe, in detail, turf grass cultivation practices commonly used in the industry, and how it impacts IPM.

- site assessment
 - turf grass type/identification
 - site use
 - site size
 - cultural requirements
 - degree of compaction
 - thatch buildup
 - poor drainage
 - ice damage
 - weed pressure
 - pest detection and identification (weeds, insects, diseases, mammals)
 - turf density/condition/quality

- winter requirements
- procedure determination routine maintenance versus site renovation
- equipment selection and use
 - manufacturers' specifications/operator's manuals
 - soil texture
 - surface slope
 - site size
 - equipment capabilities
 - equipment preparation
 - equipment operation
- aeration
 - irrigation and Utility Locates
 - methods available
 - timing based on IPM best practices (to prevent weed populations)
 - equipment adjustment
 - PPE
 - equipment operation
 - spacing
 - surface penetration
- topdressing
 - specifications
 - material selection based on IPM best practices
 - PPE
 - equipment operation
 - application rates
- dethatching/verti - cutting
 - methods available
 - timing based on IPM best practices (to prevent weed populations)
 - equipment adjustment
 - PPE
 - equipment operation
- over seeding
 - methods available
 - seed mix composition and timing based on IPM best practices (to prevent weed populations)
 - equipment adjustment
 - PPE
 - equipment operation
 - rate of application
- site clean up
 - excess materials handling
 - legal requirements
 - compostable materials
 - recyclable materials

- reusable materials
- disposal of materials
- storage containers
- transportation
- Irrigation
 - method selection
 - equipment selection
 - duration/ rate of application/syringing
- record keeping
 - legibility
 - date and time of procedure
 - turfgrass variety
 - site and weather conditions
 - practices and materials used
 - equipment used

S0575.15.3 Describe the monitoring of turf grass quality during establishment and how it relates to Plant Health Care Practices.

- turf stand colour and uniformity
- quality of clippings
- turf stand texture
- turf stand density
- individual turf components
- pest control/IPM
- tissue samples
 - testing agencies
 - test results
- reporting conditions

S0575.15.4 Describe planning of an IPM program.

- case study to include Best Practices such as:
 - record keeping
 - monitoring
 - threshold levels
 - present an IPM plan in relationship to Plant Health Care

Evaluation Methods:

Ongoing written testing/assignments

Number: **S0576**

Title: **Plant Identification 2**

Duration: 36 Hours Total

Theory: 18 Hours Practical: 18 Hours

Prerequisites: 5

Cross-reference to training standard: 6624.01, 6624.06, 6624.12, 6625.03, 6625.08, 6626.01, 6627.02, 6628.01-6628.02, 6629.01, 6629.06, and 6630.01

GENERAL LEARNING OUTCOME

Identify and describe 120 ornamental landscape plants (See Ontario 2009 Plant List), using the required nomenclature and stating the cultural requirements for each and understanding pest and disease as they relate to plant selection

LEARNING OUTCOMES AND CONTENTS

S0576.16.1 Describe how to distinguish different plant groups.

- woody trees, shrubs and vines
- deciduous / conifers
- broad-leafed evergreens
- annuals, biennials, perennials
- bulbous type plants
- weeds
- native/non-native

S0576.16.2 Identify 120 ornamental landscape plants, using the International System of Plant Nomenclature. This list shall consist of a combination of common ornamental landscape plants used in Ontario.

- family
- genus
- species (specific epithet)
- forma/variety/cultivar
- common names

S0576.16.3 Describe the key identification characteristics of the 120 ornamental landscape plants.

- leaves/needles
- flowers/fruits/seeds
- bud

- stems/ bark
- growth habit /form.

S0576.16.4 Explain the cultural requirements of the 120 ornamental landscape plants identified. Understand common pest problems associated with these plants

- moisture
- light
- soil type
- hardiness (climatic zones)
- pH/ nutrient requirements
- pruning/dead heading
- production/ cultivation/ handling and storage
- common pests

S0576.16.5 State the potential landscape uses for the 120 ornamental landscape plants identified

- plant-specific uses
- residential applications
- commercial/institutional/industrial applications
- environmental impact
 - creation of specific environments
 - siting

Evaluation Methods:

Ongoing identification testing

Number: **S0577**

Title: **Plant Materials 2**

Duration: 24 Hours Total

Theory: 12 Hours Practical: 12 Hours

Prerequisites: 6

Cross-reference to training standard: 6624.01 - 6624.05, 6624.12, 6624.16, 6630.02 – 6630.06

GENERAL LEARNING OUTCOME

Describe and demonstrate field digging and transplanting techniques including, transporting, aftercare and pruning techniques for such as annuals, woody and herbaceous plants, according to respective federal, provincial, and municipal legal requirements

LEARNING OUTCOMES

- S0577.17.1 Describe, in detail, digging methods/procedures for transplanting plants, including equipment requirements and aftercare techniques.
- site analysis
 - accessibility
 - soil type
 - site conditions
 - plant specific drainage requirements
 - quarantine requirements
 - seasonal implications/ timing.
 - tools and equipment selection.
 - plant size considerations
 - plant species/cultivar considerations
 - seasonal considerations
 - plant location considerations
 - sanitation for pest management
 - procedures for transplanting.
 - select container versus non – container and success rate
 - balled-and-bur lapped
 - tree spade
 - potted/containerized plants
 - bare-root
 - root prune
 - select best method for site and species

- post-digging plant protection and after care techniques
 - syringing
 - wrapping and protection
 - weather protection
 - irrigation including water source, irrigation equipment/ systems operation
 - staking , guying, and mulching according to industry standards
 - tree well establishment
- monitoring plant health during establishment
- tools and equipment maintenance.
 - manufacturers' specifications
 - cleaning and sanitation
 - minor repairs
 - damage/failure reporting
 - storage

S0577.17.2 Describe techniques for loading/securing plant materials for shipping.

- methods of transportation
- verify shipping order and paper work
- protection of plants and root zones
- loading and securing plants
- desiccation protection
- plant accuracy verification prior to shipping
 - quantity
 - variety
 - quality
 - size

S0577.17.3 Explain the importance of verification and acceptance of plant shipments on site.

- plan and specification requirements
- shipping documents
- plant accuracy verification
 - quantity
 - variety
 - quality
 - size
- unloading (to ensure plant protection)
- storage prior to planting

S0577.17.4 Describe pruning methods/procedures on landscape plants, including handling pruned plant parts and maintaining tools and equipment used during the process

- principles of pruning
- pruning method selection

- overall plant appearance
- deciduous plant growth requirements
- coniferous plant requirements
- diseased/infected plant parts
- timing
- tools and equipment selection
- pruning procedure
 - tool use
 - safety requirements and PPE
 - cut location
 - clean cuts
 - sanitation techniques
- contaminated plant parts
 - legal requirements
 - identification/isolation of affected materials
 - containers
 - disposal
- non-contaminated plant parts
 - legal requirements
 - area clean up
 - recyclable plant parts
 - materials for disposal
 - compostable plant parts
 - storage containers
- tools and equipment maintenance
 - manufacturers' specifications
 - equipment inspection
 - safety gear requirements
 - sharpening procedures
 - PPE
 - adjustment
 - cleaning
 - lubrication
 - defect/failure reporting
 - storage

Evaluation Methods:

Ongoing practical and written assessment.

Number: **S0578**

Title: **Site Layout, Grading and Surveying**

Duration: 36 Hours Total

Theory: 18 Hours Practical: 18 Hours

Prerequisites: 7

Cross-reference to training standard: 6624.08, 6631.02-6631.03, 6631.05, 6634.02, 6635.02, 6636.02, and 6637.02

GENERAL LEARNING OUTCOMES AND CONTENTS

Describe an environmentally sensitive site layout and drainage, including the placement and use of grading control devices, measuring devices and surveying equipment.

LEARNING OUTCOMES AND CONTENTS

S0578.18.1 Describe and demonstrate the use of measuring devices employed in the horticulture industry.

- tape measures and measuring wheels
- rulers
- surveyor's chains
- surveyor's level
- surveyor's rod

S0578.18.2 Explain the function and demonstrate the process of determining ground elevations and slopes.

- surveyor's rod and chain
- bench marks
- spot elevations
- back sights
- fore sights
- slope calculations

S0578.18.3 Describe site layout techniques.

- plan and specification interpretation
- staking out points
 - grid system
 - triangulation
 - distance and vector
- planting plans
 - scaling

- individual/mass plant locations
- measuring devices
- grading plans
 - grading control stakes
- construction plans
 - utility locations
 - obstacles and hazards
 - construction feature control points
 - existing feature protection
 - site accessibility delineation

S0578.18.4 Describe site grading procedures, including the use of grading control devices as well as drainage systems and installation.

- grading plan interpretation
 - existing grades
 - proposed grades
 - rough grades
 - finished grades
- grading control devices
 - stakes
 - cross heads
 - batter boards
 - travelers (boning rods)
 - line levels
 - offset stakes
- equipment selection and adjustment
- rough grading
 - topsoil conservation
 - cutting and filling
 - materials stockpiling
 - surface scarification
 - sub/base grades
- drainage systems and installation
 - perforated and non- perforated sub-drains
 - strip drains
 - channel drains
 - herringbone and gridiron systems
 - French drains
- topsoil re-application
- fine grading
 - surface raking/adjustment
 - surface uniformity and preparation

S0578.18.5 Describe site grading and layout procedures for environmental preservation.

- Low Impact Development
 - rainwater gardens
 - green-roofing
 - bio-retention gardens
 - retention ponds
 - detention ponds
 - permeable paving
- preventing soil compaction
- use of native plants
- erosion and silt control
- habitat preservation/restoration

Evaluation Methods:

Ongoing written and practical testing

Number: **S0579**

Title: **Landscape Construction 2**

Duration: 84 Hours Total

Theory: 24 Hours Practical: 60 Hours

Prerequisites: 8

Cross-reference to training standard: 6634.03 - 6634.16, 6635.03 - 6635.09, 6636.03 – 6636.17, 6637.03 - 6637.20

GENERAL LEARNING OUTCOME

Describe and demonstrate the handling and installation of precast landscape paving, wall units and landscape timber wall components, according to pertinent safety legislation and safe workplace practices, municipal standards and codes.

LEARNING OUTCOMES AND CONTENTS

S0579.19.1 Describe selection of tools and equipment to prepare and install natural stone and concrete landscape surfaces and walls and wood landscape features.

- site conditions
 - job size
 - site accessibility
 - power source availability
- scope of work
- manual equipment
 - mallets and hammers
 - chisels
 - handsaws
 - planes
 - levels
 - stakes and string lines
 - brick carriers
 - buggies and wheel barrows
- power equipment
 - power saws
 - power hammers
 - vibra-plate compactors
 - augers
 - planes
 - routers
 - sprayers

- safety gear

S0579.19.2 Verify materials suitability for use/application on the work site.

- plan and specification requirements
- packing/shipping documents
- types of materials
- quality of materials
- size/dimension of materials
- quantity of materials

S0579.19.3 Describe sub-grade and base preparation for the installation of natural stone and concrete landscape surfaces and walls, and wood landscape features.

- plan and specification requirements
- safety gear
- equipment operation
- excavation
 - topsoil conservation
 - subsoil
 - shoring
- sub grade compaction
- drainage feature installation
- aggregates identification
 - screenings
 - clear gravel
 - 'A' gravel
 - 'B' gravel
- base materials placement
 - aggregates
 - concrete
- base materials compaction
 - method
 - equipment
 - monitoring
- footings
 - specification requirements
 - auguring
 - son tubes'
 - hardware
 - materials

S0579.19.4 Describe installation of natural stone and concrete landscape surfaces and walls.

- edging materials
 - safety gear
 - cutting to length

- placement
- joining units
- securing
- natural stone preparation
 - plan and specification requirements
 - equipment use
 - measuring
 - safety gear
 - unit splitting
 - cutting to fit
 - unit facing
- mortar preparation
 - specification requirements
 - safety gear
 - masonry cement
 - brick sand
 - component ratio
 - mixing
 - admixtures
 - plan and specification requirements
 - manual placement
 - mechanical placement
 - safety gear
 - small unit methods
 - large unit methods
 - surface/face gradient control
- concrete form construction
 - plan and specification requirements
 - safety gear
 - materials
 - hardware
 - elevation control
 - securing and bracing
- concrete reinforcement
 - plan and specification requirements
 - reinforcing materials
 - placement and securing
- concrete preparation
 - specification requirements
 - safety gear
 - aggregates
 - concrete sand
 - cement
 - weighing/proportioning ingredients
 - water
 - mixing
 - admixtures

- concrete placing
 - even distribution
 - vibration
 - striking off
- concrete finishing
 - specification requirements
 - water of hydration
 - finishing methods
 - timing
 - edge and surface tooling
 - finish textures
- concrete curing
 - specification requirements
 - curing methods
 - timing
 - curing agents
- concrete form removal
 - timing
 - dismantling process
 - debris collection
- joint treatment
 - specification requirements
 - safety gear
 - joint positioning
 - materials
 - saw cutting
 - joint filling
- wall backfilling
 - plan and specification requirements
 - aggregates
 - filter fabric
 - drainage features
 - safety gear
 - progressive placement
- surface cleaning/finishing
 - plan and specification requirements
 - safety gear
 - excess material removal
 - cleaning solutions
 - sealing/finishing solutions
- site clean up
 - legal requirements
 - debris
 - compostable materials
 - re-usable materials
 - recyclable materials
 - hazardous materials

- materials disposal
- containment
- transportation
- tools and equipment maintenance
 - manufacturers' specifications
 - inspection
 - safety gear
 - cleaning
 - lubricating
 - defect/failure reporting

S0579.19.5 Describe installation of wood landscape features.

- wood/lumber preparation
 - plan and specification requirements
 - lumber grade stamps
 - pressure-treated wood
 - wood selection
 - equipment selection
 - measurement
 - safety gear
 - cutting to dimension
 - cut treatment
- wood construction
 - safety gear
 - tools and equipment
 - measurement
 - hardware
 - component alignment
 - nails, screws and bolts
 - adhesives
 - securing in place
- surface finishing
 - plan and specification requirements
 - method of application
 - finishing materials
 - safety gear
 - tools and equipment
 - cleaning/sanding
 - application
- site clean up
 - legal requirements
 - debris
 - compostable materials
 - re-usable materials
 - recyclable materials
 - hazardous materials
 - materials disposal

- containment
- transportation
- tools and equipment maintenance
 - manufacturers' specifications
 - inspection
 - safety gear
 - cleaning
 - lubricating
 - defect/failure reporting

Evaluation Methods:

Ongoing written and practical evaluation.

Number: **S0580**

Title: **Plan Reading, Quantity Takeoff and Quote Preparation**

Duration: 24 Hours Total I

Theory: 12 Hours Practical: 14 hours

Prerequisites: 7

Cross-reference to training standard: 6634.01, 6634.03, 6635.01, 6635.03, 6636.01, 6636.03, 6637.01, and 6637.03

GENERAL LEARNING OUTCOME

Describe reading and interpretation of plans, verification of plan accuracy, and determination of equipment, materials and labour requirements to prepare a quote.

LEARNING OUTCOMES AND CONTENTS

S0580.20.1 Describe interpretation of landscape construction plans, specifications, contracts and work orders.

- plan features
 - title blocks
 - standard symbols
 - existing elements
 - proposed elements
 - hazards
 - scope of work
 - site access
 - work/site limits
 - drawing scale
 - cardinal direction
 - plant key/list
 - legends
- specifications
 - general conditions
 - supplementary general conditions
 - scope of work
 - site access
 - contact personnel
- contract
 - date
 - agreement of parties
 - bid form/contract details and pricing
 - clearance certificates/insurance/WSIB info/performance

- bonds
- order of work
- payment terms
- guarantee information
- signature lines
- work orders
 - location
 - scope of work
 - site access
 - work sequence
 - materials
 - equipment
 - personnel

S0580.20.2 Describe inspection of work site to verify plan accuracy and site con.

- verify plan accuracy
- site access
- drainage issues
- environmental concerns

S0580.20.3 Describe and determine quantities of materials, equipment and labour required from construction plans and specifications.

- estimating processes
 - time and materials
 - detailed: -materials, equipment and labour
- estimating/bid forms and contracts
- measuring devices including:
 - scales
 - digital plan meters
 - CAD tools overview
 - measuring wheels
- material quantities
 - rates of application
 - expansion/shrinkage factors
 - shipping quantities
- equipment
 - types available/required
 - production rates
 - time required
 - minimum rental time
 - transportation
- labour
 - individual tasks
 - production rates
 - person-hours calculations
- job-related overhead

- non-specified requirements
- order of work

S0580.20.3 Describe preparation of a quote, based on a plan, taking into account the above learning outcomes.

Evaluation Methods:

Ongoing tests/quizzes, written assignments and a case study