42 AGRICULTURAL TECHNOLOGY

ORNAMENTAL HORTICULTURE

PROGRAM OF STUDY

NZU-507
1588

PRELIMINARY VERSION

VOCATIONAL EDUCATION in Secondary School

020801
6990007

Québec

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ORNAMENTAL HORTICULTURE

PROGRAM OF STUDY
NZU-507
1588

The *Ornamental Horticulture* program leads to the Secondary School Vocational Diploma and prepares the student to practise the trade of

HORTICULTURAL GARDENER

Direction générale de la formation professionnelle

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Although much research went into the choice of technical terminology in the English version, some terms may not reflect current usage or may be inaccurate. The Education Development in the English Language team would much appreciate receiving feedback from users of this document. The translators may be contacted at:

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INTRODUCTION

The *Ornamental Horticulture* program is based on the orientations for secondary school vocational education adopted by the government in 1986. It was designed on the basis of a new framework for developing vocational education programs that calls for the participation of experts from the workplace and the field of education.

The program of study is developed in terms of competencies, expressed as objectives. These objectives are divided into modules, which are organized into teaching blocks. Various factors were kept in mind in developing the program: training needs, the job situation, purposes, goals, and strategies and means used to attain objectives.

The program of study lists the competencies that are the minimum requirements for a **secondary school vocational diploma (SSVD)**, for students in both the youth and adult sectors. It also provides the basis for organizing courses, planning teaching strategies, and designing instructional and evaluation materials.

The duration of the program is 1 350 hours, which includes 810 hours spent on the specific competencies required to practise the trade or occupation and 540 hours on general competencies. The program of study is divided into 22 modules which vary in length from 30 to 120 hours (multiples of 15). The time allocated to the program is to be used not only for teaching but also for evaluation and remedial work.

This document contains two parts. Part I is of general interest and provides an overview of the training plan. It includes a synoptic table of basic information about the modules, a description of the program training goals, the competencies to be developed and the general objectives, and an explanation of operational objectives. Part II is designed primarily for those directly involved in implementing the program. It contains a description of the operational objectives of each module.

In keeping with this broad approach, three accompanying documents will be provided: a teaching guide, an evaluation guide, and a planning guide.

GLOSSARY

Program Training Goals

Statements that describe the educational aims of a program. These goals are the general goals of vocational education adapted to a specific trade or occupation.

Operational Objectives

Statements of the educational aims of a program in practical terms. They serve as the basis for teaching, learning and evaluation.

Competency

A set of socio-affective behaviours, cognitive skills or psycho-sensori-motor skills that enable a person to correctly perform a role, function, activity or task.

Module of a Program

A component part of a program of study comprising a first-level operational objective and the related second-level operational objectives.

General Objectives

Instructional objectives that provide an orientation for leading the students to attain one or more related objectives.

Credit

A unit used for expressing quantitatively the value of the modules in a program of study. One credit corresponds to 15 hours of training. Students must accumulate a set number of credits to graduate from a program.

PART I

1. SYNOPTIC TABLE

Number of modules: 22
Duration in hours: 1 350
Credits: 90

Ornamental Horticulture
SIMCA Code: NZU-507
SESAME Code: 1588

SIMCA	SESAME	TITLE OF THE MODULE	DURATION	CREDITS
NGS-286	704-352	1. The Trade and the Training Process	30	2
NGS-287	704-366	2. Applying Botanical Concepts	90	6
NGS-288	704-377	3. Applying Concepts of Plant Protection	105	7
NGS-289	704-384	4. Major Growing Media	60	4
NGT-281	704-392	5. Planting and Transplanting Trees and Shrubs	30	2
NGT-282	704-404	6. Plant Propagation	60	4
NGT-283	704-412	7. Applying Health and Safety Rules	30	2
NGT-284	704-423	8. Environmental Control of Protected Cultivation	45	3
NGT-285	704-434	9. Fertilization and Soil Amendment	60	4
NGT-286	704-442	10. Preventive Maintenance and Minor Repairs of Tools and Equipment	30	2
NGT-287	704-454	11. Introduction to the Work Environment	60	4
NGT-288	704-468	12. Maintaining Annuals and Perennials	120	8
NGT-289	704-478	13. Maintaining Houseplants and Potted Flowering Plants	120	8
NHB-281	704-482	14. Reading Landscape Plans and Specifications	30	2
NHB-282	704-492	15. Applying Ecological Concepts	30	2
NHB-283	704-502	16. Communicating in the Workplace	30	2
NHB-284	704-514	17. Starting and Maintaining Lawns	60	4
NHB-285	704-528	18. Maintaining Trees, Shrubs and Evergreens	120	8
NHB-286	704-534	19. Designing a Soft Landscaping Project	60	4
NHB-287	704-542	20. Selling Horticultural Products	30	2
NHB-288	704-552	21. Using Job Search Techniques	30	2
NHB-289	704-568	22. Entering the Work force	120	8

* 15 hours = 1 credit

--- Modules are divided into blocks of 450 hours.

This program leads to a secondary school vocational diploma in Ornamental Horticulture.

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2. PROGRAM TRAINING GOALS

The training goals of the *Ornamental Horticulture* program are based on the general goals of vocational education and take into account the specific nature of the trade or occupation. These goals are:

To develop effectiveness in the practice of a trade or an occupation.

- To teach students to perform horticultural tasks and activities correctly, at an acceptable level of competence for entry into the job market.

- To prepare students to perform satisfactorily on the job by fostering:

  - the intellectual skills needed to make sound decisions on the job
  - the skills needed to plan and organize their work
  - a concern for communicating effectively on the job
  - a constant concern for health and safety
  - a constant concern for the environment
  - a sense of observation, cleanliness, orderliness and aesthetics

To ensure integration into the working world.

- To familiarize students with the rights and responsibilities of horticultural gardeners.

- To familiarize students with the job market in horticulture in general and the trade of horticultural gardening in particular.

To foster the development of occupational knowledge.

- To foster independence and instill a sense of responsibility and a desire to succeed.

- To encourage students to strive for excellence.

- To help students become accustomed to evaluating their own work.

- To help students understand the underlying principles of various horticultural techniques.

- To help students develop effective work methods and a sense of discipline.

To ensure job mobility.

- To develop a positive attitude toward technological change and new situations.

- To encourage further learning and research.

- To prepare students for a creative job search.

3. COMPETENCIES

The competencies to be developed in the *Ornamental Horticulture* program are shown in the grid of learning focuses on the following page. The grid lists general and specific competencies as well as the major steps in the work process.

General competencies involve activities common to several tasks or situations. They cover, for example, the technological or scientific principles that the students must understand to practise the trade or occupation. Specific competencies focus on tasks and activities that are of direct use in the trade or occupation. The work process includes the most important steps in carrying out the tasks and activities of the trade or occupation.

The grid of learning focuses shows the relationship between the general competencies on the vertical axis and the specific competencies on the horizontal axis. The symbol (△) indicates a correlation between a specific competency and a step in the work process. The symbol (O) indicates a correlation between a general and a specific competency.

The symbols (▲) and (●) indicate that these relationships have been taken into account in the formulation of objectives intended to develop specific competencies related to the trade or occupation.

The logic used in constructing the grid influences the course sequence. Generally speaking, this sequence follows a logical progression in terms of the complexity of the learning involved and the development of the students' autonomy. The vertical axis of the grid shows the competencies directly related to the practice of a specific trade or occupation. These competencies are arranged in a relatively fixed order; therefore, the modules should be taught, insofar as possible, in the order represented on the grid. The modules including the general competencies on the horizontal axis should be taught in relation to those on the vertical axis. This means that some modules are prerequisite to others, while other modules are taught concurrently.

GRID OF LEARNING FOCUSES

	ORNAMENTAL HORTICULTURE	FIRST-LEVEL OPERATIONAL OBJECTIVES	DURATION (IN HOURS)	WORK PROCESS (major steps)						GENERAL COMPETENCIES (technology, personal development, etc.)											TOTALS	
	SPECIFIC COMPETENCIES (directly related to the practice of the specific occupation)			Specify the work to be done	Plan the work	Select the necessary materials	Carry out the work	Clean and tidy up	Fill out maintenance reports and charts	Apply botanical concepts	Apply concepts of plant protection	Describe the major growing media	Apply health and safety rules	Control the environmental conditions of protected cultivation	Apply principles of fertilization and soil amendment	Maintain and repair tools and equipment	Read and interpret landscape plans and specifications	Apply ecological concepts	Communicate in the workplace	Use job search techniques	NUMBER OF OBJECTIVES	DURATION (IN HOURS)
Module	Module									2	3	4	7	8	9	10	14	15	16	21		
Module	FIRST-LEVEL OPERATIONAL OBJECTIVES	T								B	B	B	B	B	B	B	B	B	S	B	11	
Module	DURATION (IN HOURS)		h							90	105	60	30	45	60	30	30	30	30	30		540
1	Determine his/her suitability for the trade and the training process	S	30																			
5	Plant trees and shrubs	B	30	△	△	△	▲	▲	△	●	●	●	○	○		○	○	○	○			
6	Propagate plants	B	60	△	△	▲	▲	▲	△	●	○	●	○	○	○	○		○	○			
11	Become familiar with various types of work environments	S	60	△	△	△	▲	△	△	○	○	○	●	○	○	○	○	○	○			
12	Maintain annuals and perennials	B	120	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	○		○	○			
13	Maintain houseplants and potted flowering plants	B	120	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	○		○	○			
17	Start and maintain lawns	B	60	▲	▲	▲	▲	▲	▲	●	●	●	●		●	●	●	●	○			
18	Maintain trees, shrubs and evergreens	B	120	▲	▲	▲	▲	▲	▲	●	●	●	●		●	●	●	●	●			
19	Design a soft landscaping project	B	60	▲	△	▲	▲			○							●		●			
20	Sell horticultural products	B	30	△			▲	▲	▲	●	●	●	●	●	●		●	●	●			
22	Enter the work force	S	120	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	●	●	●	●	●		
NUMBER OF OBJECTIVES		11																			22	
DURATION (IN HOURS)			810																			1350

S : Situational objective
B : Behavioural objective

△ Correlation between a step and a specific competency
▲ Correlation to be taught and evaluated

○ Correlation between a general and a specific competency
● Correlation to be taught and evaluated

4. GENERAL OBJECTIVES

The general objectives of the *Ornamental Horticulture* program are presented below, along with the major statement of each corresponding first-level operational objective.

To develop in the students the basic competencies needed to practise the trade of horticultural gardening.

- Apply botanical concepts.
- Apply concepts of plant protection.
- Describe the major growing media.
- Control the environmental conditions of protected cultivation.
- Apply principles of fertilization and soil amendment.
- Maintain and repair tools and equipment.
- Read and interpret landscape plans and specifications.
- Apply ecological concepts.

To develop in the students the competencies required to integrate harmoniously into the school and work environments.

- Determine their suitability for the trade and the training process.
- Become familiar with various types of work environments.
- Communicate in the workplace.
- Use job search techniques.
- Enter the work force.

To develop in the students the competencies required to perform gardening and horticultural tasks safely.

- Apply health and safety rules.

To develop in the students the competencies needed to perform tasks related to the trade.

- Plant trees and shrubs.
- Propagate plants.
- Maintain annuals and perennials.
- Maintain houseplants and potted flowering plants.
- Start and maintain lawns.
- Maintain trees, shrubs and evergreens.
- Design a soft landscaping project.
- Sell horticultural products.

5. FIRST- AND SECOND-LEVEL OPERATIONAL OBJECTIVES

5.1 DEFINITION

A first-level objective is defined for each competency to be developed. Competencies are organized into an integrated training program designed to prepare students to practise the trade or occupation. This systematic organization of competencies produces better overall results than training by isolated objectives. More specifically, it fosters a smooth progression from one objective to the next, saves teaching time by eliminating needless repetition, and integrates and reinforces learning material.

First-level operational objectives are the main, compulsory teaching/ learning targets and they are specifically evaluated for certification. There are two kinds of operational objectives: behavioural and situational.

- **A behavioural objective** is a relatively closed objective that describes the actions and results expected of the student by the end of a learning step. Evaluation is based on expected results.

- **A situational objective** is a relatively open-ended objective that outlines the major phases of a learning situation. It allows for output and results to vary from one student to another. Evaluation is based on the student's participation in the activities of the learning context.

Second-level operational objectives are intermediate teaching/learning targets deemed prerequisite for attaining first-level objectives. They are grouped according to the specifications (see 5.2 A) or the phases (see 5.2 B) of the first-level objective.

The division of operational objectives into first- and second-level objectives is based on a clear distinction between the levels of learning:

- learning involving prerequisite knowledge

- learning involving competencies

Second-level operational objectives indicate prerequisite knowledge. They prepare the students to learn what is necessary to attain the first-level operational objectives, which collectively lead to the development of a competency. The objectives should always be adapted to meet the particular needs of the individual students or groups of students.

First-level operational objectives cover the learning that the students need to develop a competency:

- The specifications or the phases of the objective determine or guide specific learning, thereby allowing the competency to be developed step by step.

- The objective as a whole (i.e. the six components and in particular the last phase of a situational objective) determines or guides the overall learning and the integration and synthesis of this learning, allowing the competency to be developed fully.

To attain the objectives, the following learning activities may be prepared:

- specific learning activities for second-level objectives
- specific learning activities for the specifications or phases of first-level objectives
- general learning activities for first-level objectives

5.2 HOW TO READ FIRST-LEVEL OPERATIONAL OBJECTIVES

A. How to Read a Behavioural Objective

Behavioural objectives consist of six components. The first three provide an overview of the objective:

1. The **expected behaviour** states a competency in terms of the general behaviour that the students are expected to have acquired by the end of the module.

2. The **conditions for performance evaluation** define what is necessary or permissible to the students during evaluation designed to verify whether or not the students have attained the objective. This means that the conditions for evaluation are the same wherever and whenever the program is taught.

3. The **general performance criteria** define the requirements by which to judge whether or not the results obtained are generally satisfactory.

The last three components ensure that the objective is understood clearly and unequivocally:

4. The **specifications of the expected behaviour** describe the essential elements of the competency in terms of specific behaviours.

5. The **specific performance criteria** define the requirements for each of the specifications of behaviour. They ensure a more enlightened decision on the attainment of the objective.

6. The **field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, occupation or field.

B. How to Read a Situational Objective

Situational objectives consist of six components:

1. The **expected outcome** states a competency as an aim to be pursued throughout the course.

2. The **specifications** outline the essential aspects of the competency and ensure a better understanding of the expected outcome.

3. The **learning context** provides an outline of the learning situation designed to help the students develop the required competencies. It is normally divided into three phases of learning:

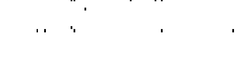
   - information
   - performance, practice or involvement
   - synthesis, integration and self-evaluation

4. The **instructional guidelines** provide suggested ways and means of teaching the course to ensure that learning takes place and that the same conditions apply wherever and whenever the course is taught. These guidelines may include general principles or specific procedures.

5. The **participation criteria** describe the requirements the students must fulfil, which are usually related to each phase of the learning context. They focus on how the students take part in the activities rather than on the results obtained. Participation criteria are normally provided for each phase of the learning context.

6. **The field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, occupation or field.

PART II



MODULE 1: THE TRADE AND THE TRAINING PROCESS

SIMCA: NGS-286
SESAME: 704-352

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will
determine their suitability for the trade and the training process.

SPECIFICATIONS

At the end of this module, the students will:

- Be familiar with the nature of the trade.
- Understand the training process.
- Confirm their career choice.

LEARNING CONTEXT

PHASE 1: **Information on the Trade**

- Learning about various socio-economic aspects of the ornamental horticulture industry in Québec: production and distribution sectors, sales revenues, employment level, potential for professional develop-ment, trends and so on (through interviews, written material, etc.).

- Learning about the job market in ornamental horticulture: potential work environments (public and private sectors, types of establishments likely to hire horticultural gardeners), job prospects, salaries, opportunities for promotion or transfer, selection of candidates (through field trips, interviews, written material).

- Learning about the nature of, and the requirements for, the job: tasks, working conditions, evaluation criteria, rights and responsibilities of workers, labour standards (through field trips, interviews, written material).

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 1: **Information on the Trade** (Cont'd)

- During a group meeting, presenting the information gathered and discussing the students' views on the trade: advantages, disadvantages and requirements.

PHASE 2: **Information on and Participation in the Training Program**

- Discussing the skills, aptitudes and knowledge required to practise the trade.
- Learning about the training plan: program of study, training process, evaluation methods, certification of studies.
- Discussing the training program and how it relates to the work of a horticultural gardener.
- Discussing the students' initial reactions to the trade and the training program.

PHASE 3: **Evaluation and Confirmation of Career Choice**

- Producing a report in which the students must:
  - describe their preferences, aptitudes, and interests with respect to the trade
  - assess their career choice by comparing the different aspects and requirements of the trade with their own preferences, aptitudes and interests.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Create a climate that is conducive to personal growth and to the students' integration into the job market.
- Encourage all the students to engage in discussions and to express themselves.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

INSTRUCTIONAL GUIDELINES (Cont'd)

The teacher should:

- Motivate the students to take part in the suggested activities.
- Help the students to acquire an accurate perception of the trade.
- Provide the students with the means to assess their career choice honestly and objectively.
- Organize field trips to companies that perform the main tasks of the trade (e.g. planting, maintenance, propagation and sales).
- Make available all pertinent documentation (e.g. information on the trade, training programs, etc.).
- Organize meetings with horticultural gardeners.
- Provide the students with prototype(s) of worksheets on which they can record the information gathered during Phases 1 and 2.
- Provide the students with a model of the report to be handed in at the end of the course.

PARTICIPATION CRITERIA

PHASE 1:

- Gather information on most of the topics to be dealt with.
- Express their views on the trade at a group meeting, interrelating the information they have gathered.

PHASE 2:

- Give their opinion on some of the requirements that they will have to meet in order to practise the trade.
- Gather information on most of the topics to be covered.
- Adequately express their views on the training program in relation to the trade.

PHASE 3:

- Write a report that:
  - sums up their preferences, interests and aptitudes
  - explains in detail how they arrived at their career choice

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities in each of the phases:

1. Understand the importance of choosing a training program that is suited to their specific needs.
2. Understand the competency to be developed as well as the suggested learning process.
3. Understand the purpose of the module.
4. Be receptive to information about the trade and the training program.
5. Be willing to share their views on the trade with other members of the group.

Before undertaking the activities of Phase 1:

6. Find the appropriate information.
7. Determine how to record and present information.
8. Differentiate between "task" and "work station."
9. Give the meaning of "entry-level qualifications."
10. Explain the main rules governing group discussions.

Before undertaking the activities of Phase 2:

11. Differentiate between the skills, aptitudes, attitudes and knowledge required to practise the trade.
12. Describe the nature, purpose and content of the program of study.

Before undertaking the activities of Phase 3:

13. Differentiate between preferences, aptitudes and interests.
14. Describe the main components of a report that confirms their career choice.

MODULE 2: APPLYING BOTANICAL CONCEPTS

SIMCA: NGS-287
SESAME: 704-366

Duration: 90 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply botanical concepts
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using plants or illustrations
- Using analytical keys

GENERAL PERFORMANCE CRITERIA

- Correct use of terminology
- Clear, accurate explanations of major physiological processes
- Observance of methodology in using analytical keys

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Describe the main types of tissues.

SPECIFIC PERFORMANCE CRITERIA

- Brief description of main tissues such as meristematic tissues, parenchyma, and protective, vascular and support tissues
- Description of function of each type of tissue

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Describe and locate the main organs of plants.	- Complete, accurate description of main organs (e.g. roots, stems, leaves, flowers, fruits and seeds) - Correct identification of various organs - Correct location of organs on plant - Identification of function of each organ
C. Describe the main physiological processes.	- Brief description of main physiological processes (e.g. respiration, transpiration, sudation, photosynthesis, nutrient absorption, growth and reproduction) - Understanding of importance of each of these functions for plant and environment
D. Solve single-cross problems.	- Appropriate application of laws - Consideration of all possible results - Accuracy of responses
E. Set up a herbarium.	- Correct choice of specimen - Careful uprooting - Correct handling - Observance of pressing techniques - Solid mounting - Mounting conforms to rules of aesthetics

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Inclusion of necessary information on identification card (e.g. place, date of harvest, plant environment) - Clear, accurate information
F. Identify plants.	- Proper use of analytical key - Correct identification of given plants (e.g. genus and species)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of identifying various plant parts and of understanding plant development.

Before learning how to describe the main types of tissues (A):

4. Describe a plant cell.
5. Identify the main types of cell division.

Before learning how to describe and locate the main organs of plants (B):

6. Be familiar with the characteristics of juvenile tissues.
7. Be familiar with the characteristics of the main mature tissues.
8. Recognize the main types of plant tissues.

Before learning how to describe the main physiological processes (C):

9. Describe vegetative physiological processes.
10. Describe reproductive physiological processes.

Before learning how to solve single-cross problems (D):

11. Understand the main laws governing genetics.
12. Differentiate phenotype from genotype.

Before learning how to set up a herbarium (E):

13. Understand the functions of a herbarium.
14. Understand the importance of using proper work methods throughout the various stages.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to identify plants (F):

15. Be familiar with the characteristics of the major plant phyla.
16. Understand how dichotomous keys are used.

MODULE 3: APPLYING CONCEPTS OF PLANT PROTECTION

SIMCA: NGS-288
SESAME: 704-377

Duration: 105 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply concepts of plant protection
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on actual problems, illustrations or photographs
- Using pesticides
- Using the necessary tools and equipment
- Following manufacturers' instructions for pesticide use

GENERAL PERFORMANCE CRITERIA

- Observance of standards for safe, rational pesticide use
- Correct identification of problems
- Selection of products that are not harmful to the environment
- Use of protective clothing, glasses and respirators
- Proper calibration of instruments
- Correct concentration of product to be applied

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Recognize the most common plant adversaries at various stages of their development and describe the damage they cause.	- Accurate description of most common pests at various stages of their development (e.g. microorganisms, insects, acarids, and other animals and weeds)

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Inclusion of information required to identify damage (e.g. affected area, colour, texture and general condition of the plant).
B. Recognize the major types of abiotic problems and explain their causes.	- Correct identification of problem - Brief description of damage caused by water, sun, wind, frost, pollution, transplantation injury, and so on. - Correct identification of cause
C. Explain the techniques used to control plant diseases, insect injuries and other disorders.	- Correct identification of main prevention techniques - Complete description of ecological preventive techniques (e.g. proper installation of mulch and geotextile covers, elimination of plant debris and weeds, spacing of plants permitting proper aeration)
D. Describe the main types of organic and chemical pesticides.	- Correct interpretation of information on label - Brief description of modes of action - Accurate description of main types of formulations - Correct association of pesticide with damage identified

FIRST-LEVEL OPERATIONAL OBJECTIVE **BEHAVIOURAL OBJECTIVE**	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	**SPECIFIC PERFORMANCE CRITERIA**
E. Describe the main types of adjuvants and additives.	- Accurate description of various types of adjuvants and additives (e.g. wetting agents, spreaders, emulsifiers, oily adjuvants, anti-foaming agents, thickeners, activators, stickers, anti-adhesives) - Correct interpretation of information on label - Brief description of modes of action - Identification of criteria used to select the appropriate adjuvant or additive
F. Prepare various pesticide formulations for application.	- Accurate description of various pesticides (e.g. emulsifiable concentrates, granules, dusts, wettable powders, and solutions) - Proper dose and quantity during preparation - Safe use of equipment - Use of protective gear - Desired level of product concentration - Proper quantities of products prepared - Homogeneous mixture - Cleanliness of material following use - Careful inspection of material - Safe, orderly storage of products and equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Plan an intervention strategy.	- Accurate assessment of damage - Appropriate type of treatment taking into account environmental protection, and the life cycle of both the pest and the plant

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of identifying the different kinds of damage caused by various pests.
4. Recognize the importance of preserving the environment when selecting means of controlling these pests.

Before learning how to recognize the most common plant adversaries and describe the damage they cause (A):

5. Identify actual pests.
6. Determine when action is required.

Before learning how to recognize the major types of abiotic problems and explain their causes (B):

7. Distinguish a healthy plant from an unhealthy one. (See Module 2.)

Before learning how to explain the techniques used to control plant diseases, insect injuries and other disorders (C):

8. Understand the importance of prevention.

Before learning how to describe the main types of adjuvants and additives (E):

9. Distinguish an adjuvant from an additive.

Before learning how to prepare various pesticide formulations (F):

10. Understand health and safety rules.
11. Recognize the importance of using protective equipment.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

12. Identify the criteria for selecting a pesticide and the adjuvant or additive used with it.
13. Calibrate the equipment.
14. Understand the laws and regulations governing the use of pesticides and pesticide wastes.
15. Recognize the importance of removing all traces of pesticide from the equipment used for application.

MODULE 4: MAJOR GROWING MEDIA

SIMCA: NGS-289
SESAME: 704-384

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
describe the major types of growing media
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using samples of natural and synthetic soils
- Using soil texture triangles
- Using reference materials, such as pH tables
- Using the necessary tools, equipment and instruments

GENERAL PERFORMANCE CRITERIA

- Mastery of sampling technique
- Proper use of testing equipment
- Correct interpretation of test data
- Mastery of technique for calculating amendments

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the characteristics of mineral soil components.	- Correct identification of components - Complete description of each component's function - Description of the components' main physical and chemical properties

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Take soil samples.	- Proper sampling technique
C. Analyze samples by sight and touch.	- Description of important elements (e.g. texture, structure, organic content) - Accurate evaluation of each element
D. Determine the acidity of the sample.	- Proper use of instruments - Observance of methods - Accurate results
E. Determine which soil amendments will improve the texture, structure and pH of soil, for a given type of cultivation.	- Appropriate selection of amendments, in accordance with test results
F. Calculate the quantity of soil amendment needed to adjust the pH.	- Correct pH level - Correct amount
G. Describe the main types of planting mixtures.	- Correct identification of main types (e.g. peat moss, vermiculite, perlite, compost) - Consideration of physical properties (e.g. water retention, compaction, drainage, and mass)
H. Identify the substrates used in hydroponic culture.	- Identification of main types of mixes - Description of various components (e.g. rock wool, peat moss, clay, volcanic rock)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. To understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of the growing medium.

Before learning how to describe the characteristics of mineral soil components (A):

4. Describe the stages of soil formation.
5. Define "soil profile."
6. Describe the various soil horizons.

Before learning how to take soil samples (B):

7. Understand the importance of taking a representative sample.
8. Explain the purpose of a soil sample.
9. Explain sampling techniques.

Before learning how to analyze samples by sight and touch (C):

10. Define what is meant by "texture" and "structure" of soil.
11. Define what is meant by "water-retention capability" of soil.

Before learning how to determine the acidity of a sample (D):

12. Explain "acidity" and "alkalinity" of soil.
13. Define "salinity" of a growing medium.
14. Use a pH meter and salinometer.

Before learning how to determine which soil amendments will improve the texture, structure and pH of soil, for a given type of cultivation (E):

15. Describe various amendments.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

16. Identify the effects of each one on the growing medium.
17. Explain the relationship between aeration and drainage of soil.

Before learning how to calculate the quantity of soil amendment needed to adjust the pH (F):

18. Explain the method used to calculate the quantity of amendment needed.
19. Use tables.
20. Apply the rule of three.

Before learning how to describe the main types of planting mixtures (G):

21. Describe the main components of planting mixtures
22. Identify the various methods used to make planting mixtures.

Before learning how to identify the substrates used in hydroponic culture (H):

23. Describe the properties of the materials used to make hydroponic culture substrates.

MODULE 5: PLANTING AND TRANSPLANTING TREES AND SHRUBS

SIMCA: NGT-281
SESAME: 704-392

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
plant and transplant trees and shrubs
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using data, field-grown trees and shrubs (for digging and ball-and-burlapping) as well as bare-root and container-grown trees and shrubs
- Using balled-and-burlapped, container-grown and bare-root trees and shrubs (for planting)
- On a given planting site
- Using raw materials such as peat moss, planting mixtures, jute, pots, fertilizer and lime
- Using the necessary tools and equipment

GENERAL PERFORMANCE CRITERIA

- Observance of landscape standards (Quebec Standards Bureau)
- Observance of urban-planning regulations
- Proper use of tools and equipment
- Correct sequence of steps
- Clean, orderly work

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Dig field-grown trees and shrubs.	- Proper use of various types of uprooting equipment and hand tools

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Proper uprooting technique: • protection of roots • size of ball • pruning of roots
B. Conserve the trees and shrubs until they are transplanted.	- Appropriate selection of conservation method, based on the following factors: • diameter of tree or shrub • intended use (e.g. as hedge or specimen) • market demand • season in which plant was dug - Observance of landscape standards - Proper ball-and-burlapping, potting, heeling-in techniques
C. Prepare the planting hole.	- Observance of minimum dimensions (landscape standards) - Proper drainage of hole - Proper preparation of planting bed - Proper use of tools (e.g. round shovel, pick, draw hoe)
D. Plant container-grown, balled-and burlapped and bare-root trees and shrubs.	- Homogeneous application of fertilizer - Proper amount - Appropriate spacing between plants - Proper disposal of containers

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Proper work techniques (e.g. for pruning roots, making the basin, watering) - Observance of landscape standards
E. Prune trees and shrubs after they have been planted.	- Mastery of pruning technique: • removal of branches proportionate to loss of roots (compensatory pruning) • clean cut - Observance of landscape standards
F. Stake trees and shrubs.	- Appropriate selection of stake or support - Solidity and appearance - Observance of landscape standards
G. Protect trees and shrubs.	- Appropriate protection method (e.g. mulching, protection against rodents and winter damage) - Installation appropriate to protection method - Observance of landscape standards
H. Clean up the planting site.	- Complete removal of debris from site - Proper levelling of soil

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Explain the importance of landscape standards.

Before learning how to dig field-grown trees and shrubs (A):

4. Identify by sight the species of the plant to be dug.
5. Describe the root system of the tree or shrub. (See Module 2.)
6. Define the proper season for digging a tree or shrub.
7. Describe the characteristics of a plant that is ready for digging.

Before learning how to conserve the trees and shrubs until they are transplanted (B):

8. Explain the relations between conservation methods and demand.
9. Explain Q.S.B. standards for planting and classifying trees, shrubs and evergreens.
10. Identify the precautions to take to keep a plant alive.

Before learning how to prepare the planting hole (C):

11. Consult urban-planning regulations and identify the major factors affecting planting.
12. Estimate the dimensions of the tree to be planted.
13. Use tools and equipment properly.
14. Determine which fertilizers to use.
15. Describe the organic soil amendments to use.
16. Locate the planting site.

Before learning how to plant cultivated trees and shrubs (D):

17. Identify the planting season.
18. Make sure the planting hole is properly drained.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

19. Show concern for the survival of the tree or shrub.
20. Determine whether the roots of the plant need to be pruned.

Before learning how to prune trees and shrubs after they have been planted (E):

21. Define the purpose of pruning.
22. Apply pruning techniques.

Before learning how to stake trees and shrubs (F):

23. Determine the direction of prevailing winds.
24. Determine whether the plant needs to be staked.

Before learning how to protect trees and shrubs (G):

25. Describe the main types of injury to trees and shrubs.
26. Determine the causes of injury .
27. Determine how much natural protection the tree or shrub receives from the environment.

Before learning how to clean up the planting site (H):

28. Develop clean, orderly work habits.

MODULE 6: PLANT PROPAGATION

SIMCA: NGT-282
SESAME: 704-404

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
propagate plants
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using data or actual cases
- Using herbaceous and woody plants, seeds, rooting hormones, propagation media (e.g. perlite, vermiculite, peat moss, sphagnum moss, planting mixtures, etc.) and various containers (e.g. pots, flats, etc.)
- Using reference materials and seed catalogues
- Using the necessary tools and equipment (e.g. pruning shears, knives, seeders, etc.)

GENERAL PERFORMANCE CRITERIA

- Safe use of tools and equipment
- Tools used for their intended purpose and within prescribed limits
- Mastery of techniques
- Correct sequence of steps
- Careful work
- Appropriate sanitary measures
- Complete, accurate labelling of products

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Select a propagation method and medium.	- Appropriate selection of method, based on type of plant and product desired

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Prepare the propagation medium.	- Appropriate container - Homogeneous medium - Amount appropriate to needs - Observance of planting depth - Proper amount of moisture
C. Calculate the quantity of seed required.	- Consideration of factors affecting the quantity required (e.g. number of seeds per gram, germination percentage, quantity desired) - Accurate calculation
D. Sow seeds.	- Observance of various techniques - Complete, correct identification of seedlings
E. Select parent plants.	- Correct identification - Plant selected according to essential qualities (e.g. juvenility, absence of insects and disease, proper size)
F. Take cuttings using various techniques.	- Proper stem-cutting, leaf-cutting and leaf-bud-cutting techniques - Appropriate selection of rooting hormone - Correct application of rooting hormone - Respect for plant material - Economical use of space - Economical use of materials

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Graft plants using T-cutting, cleft-grafting and the bridge-grafting techniques.	- Proper techniques - Correct joining of scion and stock
H. Layer plants using simple-layering, stool-layering, the air-layering and natural-layering techniques.	- Proper application of techniques - Consideration of characteristics of the plants
I. Clean and tidy up.	- Recovery of materials - Orderly storage of leftover materials - Clean premises

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of plant propagation in ornamental horticulture.
4. Understand the need to develop good work habits.

Before learning how to select a propagation method and medium (A):

5. Describe various propagation media. (See Module 4.)
6. Identify types of plants (e.g. woody, herbaceous, acaulous). (See Module 2.)

Before learning how to prepare the propagation medium (B):

7. Identify various types of containers.
8. Describe various growing media. (See Module 4.)

Before learning how to calculate the amount of seed required (C):

9. Measure the surface.
10. Look up information on seeds in seed catalogues and other reference manuals.
11. Become familiar with Q.S.B. standards for growing plants in seed flats.

Before learning how to sow seeds (D):

12. Identify various types of seedlings.
13. Use a hand seeder.
14. Label seedlings.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to select parent plants (E):

15. Identify insects or diseases on the plant. (See Module 3.)
16. Describe the characteristics of a healthy, growing plant. (See Module 2.)

Before learning how to take cuttings (F):

17. Identify various types of cuttings.
18. Use knives and pruning shears.
19. Identify the different plant organs. (See Module 2.)
20. Describe the growth stages of roots on cuttings. (See Module 2.)
21. Describe the purpose and mode of action of rooting hormones.
22. Identify the different types of rooting hormones.

Before learning how to graft plants (G):

23. Identify various types of grafts.
24. Define "scion" and "stock."

Before learning how to layer plants (H):

25. Identify various types of layerage.

Before learning how to clean and tidy up (I):

26. Understand the importance of using materials sparingly.
27. Identify reusable materials.
28. Recognize the importance of developing clean and orderly work habits.

MODULE 7: APPLYING HEALTH AND SAFETY RULES

SIMCA: NGT-283
SESAME: 704-412

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply occupational health and safety rules
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Based on cases specific to the trade
- During simulated activities
- Administering first aid in the following situations only: allergic reactions, injury with external bleeding, heat exhaustion, respiratory failure, possibility of fracture, burns and poisoning
- Using a first-aid kit
- When handling heavy objects (e.g. bags of earth, fertilizer or seed, watering cans full of water) as well as handling equipment (e.g. hand trucks, wheelbarrows, carts)

GENERAL PERFORMANCE CRITERIA

- Observance of hygiene and safety rules and professional ethics
- Arrival at correct solutions or measures when solving case studies

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Explain the general risks associated with the trade.	- List of main hazards associated with certain tasks, the work site, the use of certain types of tools and equipment and the use of various toxic products - Accurate information

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Describe applicable preventive measures.	- Complete list of applicable measures - Accurate, coherent information
C. Adopt appropriate work postures.	- Observance of principles of body mechanics - Proper use of lifting and handling equipment
D. Describe the sequence of steps to follow at the scene of an accident or in the presence of someone who is feeling ill.	- Complete, logical list of steps - Description of important elements for each step - Appropriate measures - Observance of limits of each measure
E. Administer first aid to an accident victim.	- Correct identification of signs and symptoms - Correct sequence of steps in administering first aid - Protection of victim from danger - Comfort and well-being of victim - Appropriate care for symptoms observed - Proper use of first-aid equipment and supplies

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of adopting safety-conscious attitude and behaviour.
4. Define the legal context surrounding Québec's occupational health and safety plan.
5. Identify sources of information on occupational health and safety.

Before learning how to explain the general risks associated with the trade (A):

6. List the main consequences of work-related accidents in ornamental horticulture in Québec.

Before learning how to describe applicable preventive measures (B):

7. Identify the rights and obligations of employers and workers.
8. Describe the rights, obligations, roles and responsibilities of various safety representatives and safety officers.
9. Recognize the importance of becoming personally involved in promoting safety at work.
10. Understand general safety principles.

Before learning how to adopt appropriate work postures (C):

11. Explain the risks involved in ignoring principles of body mechanics.

Before learning how to describe the sequence of steps to follow at the scene of an accident or in the presence of someone who is feeling ill (D):

12. Identify those persons who can provide assistance during an emergency and describe their main functions.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to administer first aid to an accident victim (E):

13. List the emergencies most likely to occur in the trade.
14. Define "first aid" and its purpose.
15. Explain the legal responsibility of the first aider.
16. Describe the content of a first-aid kit.

MODULE 8: ENVIRONMENTAL CONTROL OF PROTECTED CULTIVATION

SIMCA: NGT-284
SESAME: 704-423

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **control the environmental conditions of protected cultivation** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working on actual cases after having studied various types of protective structures and their environments
- Based on cases provided by the teacher
- Using greenhouse equipment such as thermometers, thermostats, furnaces, ventilators, gas heaters (CO_2), thermal blankets, sodium lamps, humidistats and hygrometers
- Using samples of covering materials

GENERAL PERFORMANCE CRITERIA

- Correct sequence of steps in building protective structures
- Complete examination of protective structures
- Proper use of tools and equipment
- Proper calibration of control equipment

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Identify the main types of protective structures.	- Correct identification of various types of protective structures (e.g. greenhouses, tunnels, hotbeds)

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Identification of building features (e.g. model, structure, shape and type of covering)
B. Explain the various factors affecting the location of a protective structure.	- Explanation of most important factors (e.g. orientation, prevailing winds, proximity to utilities, windbreaks)
C. Compare the various types of heating systems used in greenhouses.	- Brief description of main systems used (e.g. oil, natural gas, propane, wood, electrical) - Comparison of main factors influencing choice of system (e.g. source of energy, installation costs, operation costs, maintenance, reliability)
D. Describe the energy-saving methods used in protected cultivation.	- Identification of mechanical means and management systems - Detailed description of main methods used - List of distinctive features of each method
E. Control the temperature inside protective structures.	- Consideration of starting temperature and plant needs - Proper setting of thermostats
F. Describe the main types of air-control equipment.	- Correct identification of equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Accurate description of equipment used (e.g. exhaust fan, circulating fan, thermostat, motorized shutters, mist system, humidistat, hygrometer, gas burner, CO_2 bottle) - Description of means of controlling equipment, taking into account its features, function, operation and location in greenhouse
G. Describe the ways in which lighting is controlled in greenhouse production.	- Complete list of methods - Brief description of methods (e.g. appropriate spacing of plants, proper use of greenhouse coverings, appropriate use of artificial lighting)
H. Describe the main types of lamps.	- Identification of main types of lamps (e.g. incandescent, high-pressure sodium vapour lamps) - Description of mode of operation, strength, intensity and duration
I. Draw up a control chart of the conditions in a greenhouse.	- Inclusion and accuracy of all relevant information (e.g. type of plant, date, hours of sunlight, hours of artificial light, outdoor temperature, indoor temperature, humidity level, and amount of fuel used over specific period)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Describe the environmental conditions necessary for plant growth.
4. Understand the importance of indoor cultivation.

Before learning how to identify the main types of protective structures (A):

5. List the different materials used to build protective structures.
6. Describe various types of protective structures.
7. Explain the different types of coverings of protective structures.

Before learning how to explain the various factors affecting the location of a protective structure (B):

8. Define "microclimate."
9. Define the various utilities needed to erect protective structures (e.g. electricity, water, walkways).
10. Locate the direction of prevailing winds on the site.
11. Locate the cardinal points on the site.

Before learning how to compare the various types of heating systems used in greenhouses (C):

12. Describe various heaters (e.g. hot air, hot water, electric baseboards).
13. Identify the types of fuel that may be used.
14. Calculate the heating requirements for the surface area of the greenhouse.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to describe the energy-saving methods used in protected cultivation (D):

15. Understand why the cost of fuel is important in greenhouse production.
16. Describe a management plan that takes into account the seasons of the year, plant needs and market demand in planning production.

Before learning how to control the temperature inside protective structures (E):

17. Identify temperature control devices.
18. Locate control devices.

Before learning how to describe the main types of air-control equipment (F):

19. Identify air control devices in greenhouses.
20. Locate control devices.

Before learning how to describe the ways in which lighting is controlled in greenhouse production (G):

21. Explain the importance of lighting in plant physiology. (See Module 2.)

Before learning how to describe the main types of lamps (H):

22. Explain the effect of artificial lighting on plants. (See Module 2.)
23. Explain how plants are cultivated using artificial lighting.

Before learning how to draw up a control chart of the conditions in a greenhouse (I):

24. Explain the importance of drawing up such a chart.
25. Define the main elements of the chart.

MODULE 9: FERTILIZATION AND SOIL AMENDMENT

SIMCA: NGT-285
SESAME: 704-434

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply principles of fertilization and soil amendment
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using samples (to test soil) and fertilization schedules (to determine fertilizer needs)
- Based on cases (to analyze needs and make calculations)
- Using testing equipment, colorimetric tests, photos and plant leaves (to identify deficiency or toxicity symptoms)
- Using tools and equipment (e.g. spreaders, sprayers, rototillers, rakes), fertilizer, manure, compost, bone meal, etc.

GENERAL PERFORMANCE CRITERIA

- Mastery of complete soil-testing technique
- Appropriate use of testing equipment
- Correct interpretation of results
- Mastery of calculation methods
- Concern for environmental protection
- Mastery of fertilizer and amendment application techniques

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Explain the function of essential mineral elements in plant development.	- Correct identification of macroelements - Accurate description of macroelements

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Identify symptoms of macroelement deficiency and toxicity.	- Correct identification of deficiency and toxicity symptoms in plants - Proper use of symptom tables
C. Describe various types of fertilizers.	- Brief description of main types (e.g. simple, compound, organic, mineral, liquid, granulated, pelleted and gaseous fertilizers) - Identification of various fertilizers in each category - Correct identification of their uses
D. Describe various organic amendments.	- Correct identification of various types (e.g. manure, peat moss, sphagnum moss, compost and plant residues) - Complete description of their properties - Correct identification of their uses
E. Analyze a sample based on its pH, and the amount of fertilizer and organic matter it contains.	- Appropriate choice of method - Correct use of testing instruments - Complete analysis of three basic elements - Accurate results
F. Calculate how much fertilizer, lime and organic matter to add to the soil.	- Accurate calculation of quantities required - Accuracy of calculation method used

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Determine which fertilizer formula to use.	- Consideration of test results - Correct interpretation of tables - Appropriate choice of fertilizer grade
H. Prepare a soil test report.	- Inclusion and accuracy of information (e.g. surface of terrain, previous and intended cultivation, test results, fertilizer formula, amount of fertilizer to use and method of application)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Explain the importance of fertilizer for crop yields.

Before learning how to explain the function of essential mineral elements in plant development (A):

4. Explain the principles of plant nutrition.

Before learning how to identify symptoms of macroelement deficiency and toxicity (B):

5. Describe the characteristics of a healthy plant. (See Module 2.)

Before learning how to describe various types of fertilizers (C):

6. Explain the significance of the three (3) numbers in a fertilizer formula.

Before learning how to describe various organic amendments (D):

7. Describe how organic matter can improve soil. (See Module 4.)

Before learning how to analyze a sample based on its pH, and the amount of fertilizer and organic matter it contains (E):

8. Understand the importance of an accurate soil test.
9. Explain the testing methods to use.
10. Define the pH and apply pH testing methods. (See Module 4.)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to calculate how much fertilizer, lime and organic matter to add to the soil (F):

11. Use fertilizer tables.
12. Identify the products used to adjust the pH to the appropriate level. (See Module 4.)

Before learning how to determine which fertilizer formula to use (G):

13. Use fertilizer formula tables that correspond to the plant's needs.
14. Understand the importance of respecting the period of application when choosing a fertilizer formula.

Before learning how to prepare a soil test report (H):

15. Understand the importance of writing a report correctly.

MODULE 10: PREVENTIVE MAINTENANCE AND MINOR REPAIRS OF TOOLS AND EQUIPMENT

SIMCA: NGT-286
SESAME: 704-442

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
maintain and repair tools and equipment
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using tools and equipment requiring maintenance or repairs
- Based on cases provided by the teacher
- Based on actual or simulated malfunctions
- Referring to manufacturers' instructions
- Using appropriate maintenance and repair instruments
- Using protective clothing such as safety gloves and goggles
- Using oil, grease and spare parts

GENERAL PERFORMANCE CRITERIA

- Observance of health and safety rules
- Observance of limits to which tools may be used
- Proper sequence of maintenance operations
- Mastery of sharpening techniques
- Mastery of techniques for changing oil, filters and spark plugs
- Clean, orderly work

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Check the operating condition of the tools and equipment.	- Identification of points to be checked - Thorough verification - Application of necessary corrective measures

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Sharpen the cutting parts of tools and equipment.	- Proper selection of sharpening tools - Mastery of sharpening technique - Satisfactory cutting profile - Use of safety goggles and gloves
C. Lubricate and adjust movable parts.	- Proper selection of lubricants - Precise adjustment of belts, knives, blades, etc.
D. Change oil, filters and spark plugs.	- Proper selection of oil, spark plugs and gas, air and oil filters - Mastery of oil changing techniques, in accordance with the type of motor
E. Make minor repairs on defective and broken parts.	- Correct identification of various components and their functions - Correct diagnosis of cause of damage - Replacement of appropriate parts - Proper adjustment
F. Clean tools and equipment.	- Thorough cleaning of various parts - Proper removal of grease, excess oil, grass debris, soil and rust

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Set up a cleaning and maintenance program.	- Inclusion of the following operations: • emptying gas tanks and radiators • adjusting belts • lubricating tools and equipment • cleaning tools and equipment - Logical sequence of steps - Observance of manufacturers' instructions

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Understand the importance of working with tools and equipment that are in good condition for the firm and for the safety of the user.

Before learning how to check the operating condition of the tools and equipment (A):

4. Describe how the tools and equipment work.
5. Describe the precautions to take when handling tools and equipment.
6. Use small mechanical tools properly.

Before learning how to sharpen the cutting parts of tools and equipment (B):

7. Recognize a well-sharpened part by sight.
8. Adopt safe working methods.
9. Identify the cutting parts of tools and equipment.
10. Select the appropriate sharpening method.

Before learning how to lubricate and adjust movable parts (C):

11. Determine by sight and sound whether a part is improperly adjusted.
12. Identify the movable parts of tools and equipment.
13. Select the appropriate lubricant.

Before learning how to change oil, filters and spark plugs (D):

14. Describe the principle of a two-stroke motor.
15. Describe the principle of a four-stroke motor.
16. Locate the oil pan, filters and spark plugs on equipment.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make minor repairs on defective and broken parts (E):

17. Define the gardener's role in making repairs.
18. Differentiate major repairs from minor ones.

Before learning how to clean tools and equipment (F):

19. Show a concern for clean, orderly work.
20. Determine the precautions to take before cleaning.

Before learning how to set up a cleaning and maintenance program (G):

21. Explain the preparatory steps to putting away tools and equipment.

MODULE 11: INTRODUCTION TO THE WORK ENVIRONMENT

SIMCA: NGT-287
SESAME: 704-454

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will
become familiar with various types of work environments in which horticultural gardeners are employed: nurseries, greenhouses, gardens, and landscaping and landscape maintenance companies or services.

SPECIFICATIONS

At the end of this module, the students will:

- Be familiar with the tasks and working conditions particular to each work environment.
- Contact resource persons in the field.
- Begin looking for a practicum position.

LEARNING CONTEXT

PHASE 1: **Information on Aspects of the Work Environment**

- Learning about the job and the job requirements in each type of work environment: work station, tasks, working conditions and evaluation criteria.
- Learning about resource centres in the field: professional associations, government agencies, and so on.
- Learning about major trade events in the field: conferences, trade shows, fairs, and so on.
- Writing the information gathered on data cards.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: **Participation in the Work Environment**

- Observing and participating in horticultural tasks in various work environments.
- Participating in trade events: conferences, trade shows, fairs and so on.
- Gathering information on vocational tasks and resource centres in various work environments.

PHASE 3: **Assessment of the Situation**

- Writing a report that takes stock of the similarities and differences of the different work environments and relates them to the students' preferences, interests and personal values.
- Discussing how the students' experiences in the work environment affect their choice of a practicum position.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Provide the students with relevant information: information on the workplace, professional associations and trade events.
- Encourage the students to engage in discussions and to express their opinions.
- Provide the students with a realistic view of the various work environments.
- Organize a meeting with resource persons in the field, such as representatives of professional associations.
- Make it possible for students to observe and participate in tasks in the various work environments.
- Give the students forms on which to record information.
- Provide the students with a model for their end-of-term report.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- Gather information on most of the topics to be dealt with.

PHASE 2:

- Observe company policies regarding the activities they are allowed to carry out.
- Follow instructions during field trips.
- Record information on data cards about the nature of the job and the job requirements for each work environment.
- Obtain reference material on the resources in the field.
- Give their impressions on the trade events they attend.

PHASE 3:

- Write a report describing the similarities and differences of the work environments and establishing a relation between their preferences, interests and personal values and their choice of a practicum position.
- Explain their observations by showing how the information they have gathered has affected their choice of a practicum position.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities in each of the phases:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before undertaking the activities of Phase I:

3. Gather information. (See Module 1.)
4. Determine a way of recording and presenting data. (See Module 1.)
5. Differentiate a task from a work station. (See Module 1.)
6. Summarize the main steps of methodical research. (See Module 1.)
7. Explain the main rules governing group discussion.

Before undertaking the activities of Phase 2:

8. Explain what is meant by "resource centre" in the field.
9. Explain what is meant by "trade event."

Before undertaking the activities of Phase 3:

10. Describe the main information that must be contained in the evaluation report.

MODULE 12: MAINTAINING ANNUALS AND PERENNIALS

SIMCA: NGT-288
SESAME: 704-468

Duration: 120 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
maintain annuals and perennials
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on simulated activities or using actual plants
- Referring to an established list of the most common plants
- Using plants, illustrations, slides or photos for identification purposes
- Using the necessary tools and equipment (e.g. knives, pruning shears, sprayers, watering systems, trowels)
- Using the required safety equipment
- Using the geotextile membranes of fertilizers and pesticides
- Referring to the landscape standards concerning the maintenance and number of plants per flat

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Observance of Q.S.B. standards
- Respect for plant material
- Correct identification of plants
- Proper use of tools and equipment
- Clean, orderly work
- Concern for an attractive finish

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the main annuals and perennials grown in Québec (including bulbs).	- Identification of genus and species - Complete description of life cycle, habits, dimensions (height and width), foliage characteristics (shape, colour), flower characteristics (type, size, colour), reserve organ, time of bloom, use, type of cultivation (exposure, soil, fertilizer, water needs, spacing, planting time, pruning, etc.) method and time of propagation
B. Interpret a production program.	- Understanding of relevant information (e.g. sowing date, germination period, planting date, number of plants per flat or pot, fertilizers, growth inhibitors, pesticides, anticipated selling time, special care, etc.)
C. Plant seedlings.	- Proper preparation of growing medium - Correct identification of seedlings ready for planting - Appropriate selection of container - Proper handling of seedlings - Proper spacing of seedlings - Number of seedlings in conformity to Q.S.B. standards - Complete, accurate labeling - Adequate watering of plants - Proper handling of pots and flats

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
D. Water plants.	- Correct assessment of the soil's hydric condition - Consideration of climatic factors - Correct use of watering equipment - Thorough watering - Appropriate application of water conservation techniques
E. Apply pesticides and fertilizers.	- Use of protective clothing and safety equipment - Proper dose - Proper calibration of apparatus - Observance of standards for rational pesticide use - Proper use of equipment - Consideration of mode of action during application - Safe removal of residue - Thorough cleaning of apparatus and equipment - Thorough inspection of apparatus, clothing and equipment
F. Make planters and flower boxes.	- Appropriate selection of material - Proper preparation of growing medium - Proper spacing of plants - Solidity of suspension material - Attractive finished product

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Make a flower bed of annuals, perennials and bulbs.	- Proper preparation of flower bed (e.g. cleaning, fertilizing, levelling) - Observance of planting depth - Consideration of height, width, bloom time, and colour - Proper spacing of plants - Adequate watering - Proper installation of mulch, inert groundcovers or geotextile membranes - Conformity to rules of aesthetics
H. Set up a maintenance program.	- Consideration of pertinent factors - Correct assessment of needs - Correct scheduling of maintenance operations - Correct identification of maintenance procedures - Logical sequence of steps
I. Fill out maintenance forms or charts.	- Inclusion of necessary information (e.g. date, product, concentration, plants treated) - Clarity of information - Accuracy of information

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of maintenance in ornamental horticulture. (See Module 1.)

Before learning how to describe the main annuals and perennials grown in Québec (A):

4. Define the terms "annual" and "perennial."
5. Identify various types of roots, stems, leaves and flowers. (See Module 2.)
6. Identify the main methods of propagation. (See Module 6.)

Before learning how to interpret a production program (B):

7. Understand the importance of proper planning.

Before learning how to plant seedlings (C):

8. Propagate plants using seeds. (See Module 6.)
9. Identify parts of a seedling. (See Module 2.)

Before learning how to water plants (D):

10. Understand how plants absorb water. (See Modules 2 and 4.)
11. Understand why water is important to plants. (See Module 4.)

Before learning how to apply pesticides and fertilizers (E):

12. Identify problems. (See Modules 3 and 9.)
13. Identify the main types of pesticides and fertilizers. (See Modules 3 and 9.)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make planters and flower boxes (F):

14. Describe various growing media. (See Module 4.)

Before learning how to make a flower bed of annuals, perennials and bulbs (G):

15. Describe the technique for planting annuals, perennials and bulbs.
16. Explain the underlying principles of flower beds.
17. Describe the methods of reducing transplanting shock.
18. Identify the plants that cannot be transplanted easily.

Before learning how to set up a maintenance program (H):

19. Understand the importance of planning horticultural projects properly.
20. Describe the steps involved in cleaning a flower bed.
21. Understand the importance of removing debris and weeds. (See Module 3.)
22. Identify the needs of herbaceous plants. (See Module 2.)
23. Describe the techniques for removing, drying and storing tender bulbs.
24. Describe the operations to perform on a herbaceous flower bed before winter.

Before learning how to fill out maintenance forms or charts (I):

25. Understand the importance of recording such information.

MODULE 13: MAINTAINING HOUSEPLANTS AND POTTED FLOWERING PLANTS

SIMCA: NGT-289
SESAME: 704-478

Duration: 120 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
maintain houseplants and potted flowering plants
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- During actual or simulated maintenance activities
- Referring to an established list of the most common plants
- Using plants, illustrations, slides or photos for identification purposes
- Using the necessary tools and equipment (e.g. knives, pruning shears, sprayers, watering systems, etc.)
- Using the required safety equipment
- Using pots, planters, stakes, trellises, etc.
- Using the necessary basic materials (e.g. planting mixtures, fertilizers, pesticides, growth inhibitors, etc.)
- Using various equipment to control indoor environmental conditions (e.g. lighting, ventilation, heating, etc.)

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Proper use of tools and equipment
- Respect for plant material
- Correct identification of plants
- Clean, orderly work
- Attention to detail

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the main types of houseplants and potted flowering plants.	- Correct identification of genus and species - Complete description of shape/habits, dimensions, foliage characteristics (shape, colour, etc.), flower characteristics (type, size, colour, duration of bloom), production and selling time, cultivation (exposure, temperature, soil, fertilizer, special care, etc.), method and time of propagation, and main adversaries
B. Interpret a production program.	- Understanding of relevant information (e.g. most profitable production method, special care during production, lighting needs, amount of daylight, fertilizers, growth inhibitors, pesticides, estimated selling time, etc.)
C. Evaluate environmental conditions.	- Consideration of temperature, lighting, ventilation, carbon dioxide, air circulation - Correct evaluation, based on plants cultivated - Verification of information obtained from environment control equipment - Appropriate adjustment of equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
D. Receive a shipment of plants.	- Thorough verification of the condition of the merchandise and its conformity with the order placed - Careful handling of plants during unpacking - Essential care provided (e.g. watering, lighting)
E. Label plants.	- Use of appropriate material - Correct identification - Inclusion of all relevant information - Logical layout of information on label - Clarity of information
F. Water plants.	- Correct evaluation of needs - Appropriate selection of equipment - Proper use of watering equipment - Adequate watering of all plants
G. Apply pruning, pinching and disbudding techniques.	- Appropriate choice of technique for plant and desired effect - Observance of techniques - Proper use of tools - Attractive finished product
H. Stake plants.	- Correct evaluation of needs - Appropriate selection of stake - Solidity of installation - Attractive installation

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
I. Apply fertilizers, growth inhibitors and pesticides.	- Use of protective gear and clothing - Observance of prescribed dose - Proper calibration of apparatus - Observance of standards for rational pesticide use - Proper use of equipment - Consideration of mode of action during application - Safe disposal of residue - Thorough cleaning of apparatus, clothing and equipment - Thorough inspection of apparatus and equipment
J. Repot plants.	- Correct assessment of repotting needs - Appropriate selection of growing medium and container for the plant or desired effect - Homogeneous growing medium in sufficient quantity - Careful removal of plant from pot - Correct evaluation of root system - Proper spacing of plants - Proper planting depth - Proper compacting of soil - Adequate watering - Proper installation of suspension material, if applicable

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
K. Fill out maintenance reports or charts.	- Inclusion of all relevant information (e.g. date, identification of problem, product applied, dose, environmental conditions) - Clarity of information - Accuracy of information

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of the maintenance of houseplants and potted flowering plants in ornamental horticulture. (See Module 1.)
4. Understand the qualities sought in houseplants or potted flowering plants.

Before learning how to describe the main types of houseplants and potted flowering plants (A):

5. Differentiate a houseplant from a potted flowering plant.
6. Identify various types of roots, stems, leaves, flowers and fruits. (See Module 2.)
7. Use an analytical key. (See Module 2.)

Before learning how to interpret a production program (B):

8. Identify the major stages in plant development. (See Module 2.)
9. Identify the factors affecting plant development. (See Module 2.)
10. Understand the importance of following a production program.

Before learning how to evaluate environmental conditions (C):

11. Identify the environmental factors affecting plant development. (See Modules 2 and 8.)

Before learning how to label plants (E):

12. Use analytical keys. (See Module 2.)
13. Understand the importance of correct identification. (See Module 2.)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to water plants (F):

14. Understand how plants absorb water. (See Module 4.)
15. Understand why plants need water. (See Modules 2 and 4.)
16. Describe the main types of growing media. (See Module 4.)

Before learning how to apply pruning techniques (G):

17. Understand how plants develop. (See Module 2.)

Before learning how to stake plants (H):

18. Identify plants that need to be staked.
19. Explain the purpose of staking plants.
20. Describe the main types of stakes.

Before learning how to apply fertilizers, growth inhibitors and pesticides (I):

21. Identify the main types of fertilizers. (See Module 9.)
22. Describe the function of growth inhibitors.
23. Identify the main adversaries of plants. (See Module 3.)
24. Identify the main types of pesticide. (See Module 3.)
25. Describe the main types of equipment used to apply these products (See Modules 3 and 9.)

Before learning how to repot plants (J):

26. Identify stress symptoms in plants. (See Module 2.)
27. Define the function of a root system. (See Module 2.)
28. Describe various growing media. (See Module 4.)
29. Identify plants that need to be repotted.

Before learning how to fill out maintenance reports or charts (K):

30. Understand the importance of recording such information.

MODULE 14: READING LANDSCAPE PLANS AND SPECIFICATIONS

SIMCA: NHB-281
SESAME: 704-482

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
read and interpret landscape plans and specifications
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Referring to setting-out plans, topographical maps and planting plans, construction-detail and planting drawings, and specifications, as per the Q.S.B. landscape standards
- Using an engineer's level and a measuring tape

GENERAL PERFORMANCE CRITERIA

- Logical work method
- Attention to detail
- Accurate analysis and interpretation of plans and specifications

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Describe setting-out plans, topographical maps, and planting plans.

SPECIFIC PERFORMANCE CRITERIA

- Identification of all information contained in each type of plan (e.g. construction-detail and planting drawings, dimensions, materials, radii and angles, contour lines before and after the work, sectional and top views of specific aspects of the landscaping

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Brief description of function of each type of plan
B. Extract the necessary information from the specifications.	- Overall description of work to be done - Inclusion of technical information required to do the work (e.g. type of materials, work method, quality of materials, rules and standards to be observed)
C. Interpret graphic codes and symbols on landscape plans.	- Correct interpretation of codes and symbols
D. Determine the sequence of operations of a landscaping project, based on the plans.	- Consideration of all elements in the plans - Logical sequence of operations

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Understand the relationship between the abstract (plans) and the concrete (landscaping).

Before learning how to describe various types of plans (A):

4. Describe the content of each type of plan.
5. Measure, to scale, spaces on a plan using an engineer's level.
6. Read contour lines on a plan.

Before learning how to extract the necessary information from the specifications (B):

7. Explain the purpose of specifications in a landscaping project.
8. Identify the different sections of specifications.
9. Identify the main headings used in specifications.
10. Define the main technical terms used in specifications.
11. Identify the products and materials needed to complete a landscaping project.
12. Apply the appropriate standards.
13. Understand how the landscaping project is to be divided with respect to other components of the specifications.

Before learning how to interpret graphic codes and symbols on landscape plans (C):

14. Describe the general information contained in a plan.
15. Master the plan view.
16. Master the concepts of scaling.
17. Recognize types of plants by their latin names.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to determine the sequence of operations of a landscaping project, based on the plans (D):

18. Explain the stages in carrying out a landscaping project.

MODULE 15: APPLYING ECOLOGICAL CONCEPTS

SIMCA: NHB-282
SESAME: 704-492

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply ecological concepts
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on cases specific to the trade

GENERAL PERFORMANCE CRITERIA

- Observance of environmental protection laws and regulations
- Constant concern for the environment

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Identify the main factors affecting the stability of the ecosystem.	- Correct identification of major pollutants
B. Describe the extent of pesticide use.	- Accurate description of main pesticide uses, in terms of quantity and monetary value - Correct identification of the main intermediaries involved in distributing and using pesticides

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
C. Describe possible sources of air, water and soil contamination by pesticides.	- Mention of main sources of contamination - Description of the effects of pesticides on the environment
D. Describe the impact of pesticides on plants and animals.	- Accurate description of main effects (e.g. physiological changes, resistance development, decrease in predator insects and parasites, elimination of polliniferous insects and lethal and sub-lethal effects on animals) - Clarity of information
E. Describe potential health problems related to pesticide use.	- Complete, accurate description of major health problems in human beings - Correct association of problems with various horticultural tasks
F. Identify the factors affecting attitudes towards pesticide use.	- Complete list of pros and cons of pesticide use - Identification of steps involved in changing attitudes - Justification of need to change public attitudes toward pesticide use

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Summarize the laws and regulations governing pesticide use.	- Inclusion of main elements (e.g. object of law, scope, obligations and consequences of infractions) - Accuracy and clarity of information
H. Identify the stages of a pest-control program.	- Identification of indirect methods - Proper time for direct action - Logical sequence of steps
I. Describe guidelines for proper pesticide application.	- Inclusion of main aspects to consider (e.g. drift, resistance prevention, environmental protection) - Accurate description of steps to take if treatment is ineffective
J. Identify an ecological problem, suggest a solution and explain its effect on the environment.	- Correct identification - Ecological solution - Complete, accurate description of intended effect

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before learning how to identify the main factors affecting the stability of the ecosystem (A):

3. Define what is meant by "ecology."

Before learning how to describe the extent of pesticide use (B):

4. Identify the economic advantages of pesticide use.
5. Identify the social advantages and disadvantages of pesticide use.

Before learning how to describe potential health problems related to pesticide use (E):

6. Identify the sources of pesticide exposure.
7. Identify the ways in which pesticides enter the body.
8. Define what is meant by "toxicity."
9. Identify the gardening or horticultural tasks related to pesticide use.

Before learning how to identify the factors affecting attitudes towards pesticide use (F):

10. Identify alternatives.
11. Recognize hazardous practices related to pesticide use.
12. Be aware of the importance of changing attitudes towards pesticide use.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to summarize the laws and regulations governing pesticide use (G):

13. Identify various levels of intervention.
14. Consult laws and regulations.

Before learning how to identify the stages of a pest-control program (H):

15. Understand the importance of planning a program properly.
16. Identify possible adversaries and their causes. (See Module 3.)

MODULE 16: COMMUNICATING IN THE WORKPLACE

SIMCA: NHB-283
SESAME: 704-502

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will
communicate in the workplace.

SPECIFICATIONS

At the end of this module, the students will:

- Understand the general communication process.
- Improve their ability to communicate effectively.
- Be aware of the importance of communication in the workplace.

LEARNING CONTEXT

PHASE 1: **Information**

- Learning about the communication process (using audio-visual and written materials).
- Learning about the oral and written means of communication used by horticultural gardeners (using reference materials, and through interviews and telephone calls).
- Identifying the characteristics of, and obstacles to, effective communication (through role playing).
- Learning about the important aspects of communication with customers (through role playing).

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: **Participation**

- Participating in simulated communication activities specific to the trade (e.g. communication with customers, superiors and colleagues):
  - observing their attitudes and behaviour concerning communication
  - identifying their strengths and weaknesses
- Participating in discussions on the various aspects of oral and written communication in their future workplace.

PHASE 3: **Self-Evaluation**

- Assessing their progress with respect to the expected outcome (through group discussions).

INSTRUCTIONAL GUIDELINES

The teacher should:

- Encourage all students to participate.
- Use a group-discussion approach.
- Provide the students with relevant reference material.
- Give the students forms on which to record information obtained during the course of their research, role-play and simulated activities.
- Prepare guidelines for role-plays that reflect typical situations in the workplace.

PARTICIPATION CRITERIA

PHASE I

- Obtain information on the topics to be dealt with:
  - draw a diagram of the communication process
  - draw up a list of situations in which horticultural gardeners are called upon to communicate orally and in writing
  - draw up a list of the characteristics of, and obstacles to, effective communication
  - draw up a list of the important aspects of communication with customers

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1 (Cont'd):

- Participate actively in role-playing:
  - participate in preparing role-plays
  - follow the rules governing role-playing
  - express their reactions as observers to the role-playing activities

PHASE 2:

- Participate actively in simulated activities:
  - participate in preparing simulated activities
  - follow the rules governing simulated activities
  - express their reactions as observers to the simulated activities
  - record on a form the attitudes and behaviour observed
  - draw up a list of some of their own strengths and weaknesses
- Participate actively in discussions:
  - express their views on the importance of the main communication means used by horticultural gardeners
  - ask their colleagues questions
  - give examples

PHASE 3

- Evaluate their own ability to communicate.
- Be willing to discuss their perceptions of themselves as communicators with other members of the group:
  - express their perceptions of themselves as communicators
  - react to the perceptions others have of them as communicators
  - give their impression of at least one other student as a communicator

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities in each of the phases:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of communication in the workplace.

Before undertaking the activities of Phase I:

4. Gather information. (See Module 1.)
5. Determine how to record and present the information gathered. (See Module 1.)
6. Explain what role-playing involves.

Before undertaking the activities of Phase 2:

7. Explain what simulated activities involve.
8. Differentiate role-playing from simulation.
9. Explain the main rules governing group discussion. (See Module 1.)

Before undertaking the activities of Phase 3:

10. Explain the steps involved in the process of self-evaluation.

MODULE 17: STARTING AND MAINTAINING LAWNS

SIMCA: NHB-284
SESAME: 704-514

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
start and maintain lawns
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working on an actual outdoor surface (to start a lawn)
- Working on an existing lawn (to maintain a lawn)
- Based on case studies (to determine the method of starting a lawn and applying fertilizers and pesticides)
- Using the necessary materials (e.g. sod, soil, amendments, seed, fertilizers, pesticides and soil testing equipment)
- Using the necessary tools and equipment

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Use of steel-tip shoes at all times
- Observance of landscape standards
- Proper use of tools and equipment
- Respect for the environment during pesticide and fertilizer application
- Attractive finish

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Test the soil and determine the amendments.	- Mastery of sampling technique - Accuracy of test

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Correct identification of amendments - Accurate calculation of quantities required
B. Prepare the soil, i.e. clean the site, grade and add amendments.	- Clean site - Proper disposal of debris - Observance of minimum incline - Conformity to calculations - Uniform application
C. Determine the appropriate type of grass and propagation method to use.	- Consideration of environmental conditions, needs, time of year and customer's budget - Appropriate selection of type of grass and propagation method
D. Start a lawn from seed and from sod.	- Observance of techniques - Observance of landscape standards
E. Carry out lawn maintenance tasks, such as raking, aeration, dethatching, composting, mowing and repairing damaged areas.	- Observance of landscape standards - Clean, careful work - Observance of techniques
F. Apply fertilizers and pesticides.	- Appropriate quantities for surface area - Use of protective clothing and gear during pesticide application - Proper calibration of equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
	- Uniform application - Observance of standards for rational pesticide use
G. Clean the site once the work is done.	- Absence of debris on the site
H. Set up a maintenance program.	- List of needs - Identification of operations: dethatching, aeration, fertilizing and weeding, repairs (if necessary) and mowing - Logical sequence of operations
I. Write a maintenance report (for fertilizers and pesticides).	- Inclusion of relevant information: date of application, products used, applied dose, type of product (insecticide, herbicide, fertilizer, fungicide), diseases and insects observed, time of observation, surface area treated and results observed (subsequent visits)) - Accuracy and clarity of information

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before learning how to test the soil and determine the amendments (A):

3. Describe soil testing techniques.
4. Describe the amendments. (See Modules 4 and 9.)

Before learning how to prepare the soil (B):

5. Understand the importance of proper soil preparation when starting a new lawn.
6. Describe soil preparation operations for starting a new lawn (in conformity to landscape standards).
7. Use the appropriate tools (e.g. rakes, rototillers, shovels, levels).

Before learning how to determine the appropriate type of grass and propagation method to use (C):

8. Differentiate seeding from sodding.
9. Describe the different lawn seed mixtures.
10. Explain how environmental conditions affect the growth of grass.

Before learning how to start a lawn (D):

11. List the techniques for starting lawns from seed (in conformity to landscape standards).
12. List the techniques for starting lawns using sod.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to carry out lawn maintenance tasks (E):

13. Distinguish the different lawn maintenance tasks.
14. Determine the appropriate season in which to carry out lawn maintenance tasks.
15. Describe the use of various equipment (e.g. lawn aerator, dethatcher, mower and edger).
16. Explain the principles of lawn-mowing.
17. Apply concepts of sowing, replanting or composting to repair damaged areas.

Before learning how to apply fertilizers and pesticides (F):

18. Describe the nutrient level of various fertilizer grades.
19. Classify fertilizers according to their period of application (i.e. spring or fall).
20. Identify the main symptoms of lawn diseases.
21. Identify the main type of damage caused by lawn insects.
22. Identify the symptoms of N-P-K deficiency or toxicity in lawns.
23. Explain how fertilizer and pesticide spreaders and sprayers operate.
24. Identify methods of applying fertilizers, herbicides, insecticides and fungicides.
25. Describe proper finishing operations.

Before learning how to set up a maintenance program (H):

26. Describe the logical sequence of operations involved in starting a lawn.

Before learning how to write a maintenance report (I):

27. List the information that must be included in maintenance report.

MODULE 18: MAINTAINING TREES, SHRUBS AND EVERGREENS

SIMCA: NHB-285
SESAME: 704-528

Duration: 120 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
maintain trees, shrubs and evergreens
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Referring to an established list of the most common plants
- Based on case studies simulating a maintenance program
- Based on actual situations
- Using slides, potted plants or nursery plants (for purposes of identification)
- Using the necessary tools and equipment (e.g. pruning shears, knives, saws, fertilizer spreaders, sprayers, rakes and soil augers)
- Using the required protective gear (e.g. boots, safety goggles, gloves and overalls)
- Using materials (e.g. fertilizers, insecticides, fungicides, trellises, snow fences and jute)

GENERAL PERFORMANCE CRITERIA

- Observance of landscape standards (Q.S.B.)
- Observance of occupational health and safety rules
- Respect for the environment during pesticide and fertilizer application
- Proper use of tools and equipment
- Mastery of pruning techniques
- Conformity to rules of aesthetics
- Clean, well-finished work

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the trees, shrubs and evergreens used in landscaping in zones 2 to 5.	- Correct identification of tree, based on the following criteria: • deciduous or evergreen • height, width, rate of growth, habits of species • characteristics of foliage, flower, fruit, bark and roots • main insects and diseases affecting species and appropriate pesticides • appropriate type of soil for growth • exposure • hardiness zone • pruning period and type of method • use in landscaping
B. Apply fertilizers and pesticides.	- Observance of foliar spray, band and plow-down application techniques - Proper adjustment of sprayers and spreaders - Accurate calculation of quantities required - Use of protective clothing, gloves, goggles, respirators, overalls and boots - Elimination of pesticide residue - Careful handling of cutting tools - Observance of standards for rational and safe pesticide use

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
C. Prune trees and repair wounds.	- Appropriate selection of branches to prune - Proper use of pruning tools - Observance of landscape standards - Observance of rules of aesthetics - Correct diagnosis - Appropriate corrective measures - Observance of pruning techniques (e.g. compensatory and maintenance pruning, training, thinning and trimming)
D. Prune shrubs and evergreens.	- Appropriate selection of branches to prune - Proper use of pruning tools - Observance of landscape standards - Observance of pruning techniques (e.g. branch orientation, compensatory, maintenance and rejuvenation pruning, hedge clipping, heading back, pinching, debudding) - Observance of rules of aesthetics
E. Protect trees from winter injury.	- Appropriate selection of protective material - Correct application of protection technique, in conformity to Q.S.B. landscape standards - Observance of rules of aesthetics

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
F. Clean up the site.	- Safe elimination of pesticide residue - Eradication of weeds
G. Set up a maintenance program.	- Consideration of relevant factors - Correct identification of needs - Correct identification of maintenance periods - Complete treatment administered in logical sequence
H. Write a maintenance report.	- Clear presentation - Inclusion of relevant information: customer's name and address, sketch of terrain, location of trees, shrubs and evergreens treated, identification of trees, shrubs or evergreens (genus, species, variety), type of fertilization (product, dose, application, date), pesticides used (insects or diseases observed, name of product, type of product [insecticide, fungicide] dose, type of application, date), pruning (pruning technique, date), repairs (description, date), results observed (on subsequent visits) - Accuracy and clarity of information

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before learning how to describe trees, shrubs and evergreens used in landscaping in zones 2 to 5 (A):

3. Explain the various botanical functions of each plant part (roots, stems, leaves, flowers, fruits). (See Module 2.)
4. Identify the major insects that attack trees, shrubs and evergreens, and the methods of eliminating these pests. (See Module 3.)
5. Identify the main diseases affecting trees, shrubs and evergreens, and the methods of treating these diseases. (See Module 3.)
6. Describe the characteristics of soil that is conducive to plant growth. (See Module 4.)
7. Name the various factors to consider when identifying plants.
8. Recognize the characteristics used for specimen identification. (See Module 2.)
9. Show concern for the accuracy of the characteristics used in plant identification.

Before learning how to apply fertilizers and pesticides (B):

10. List the pesticides used against each type of parasite affecting trees, shrubs and evergreens. (See Module 3.)
11. Describe the fertilizer grades used on trees, shrubs and evergreens. (See Module 9.)
12. Calculate the quantities required. (See Module 9.)
13. Name the periods best suited for spraying and applying fertilizers. (See Module 9.)
14. Describe fertilizer and pesticide application techniques. (See Modules 3 and 9.)
15. Select the necessary tools and equipment. (See Module 9.)
16. Calibrate the apparatus. (See Modules 3 and 9.)
17. Adopt safe work methods. (See Modules 3 and 7.)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to prune trees and repair wounds (C):

18. Explain the importance of pruning trees.
19. Explain various types of pruning techniques.
20. Identify the wounds that require surgery.
21. Select the appropriate method of repairing a wound.
22. Use pruning and surgical tools and equipment safely.

Before learning how to prune shrubs and evergreens (D):

23. Explain the various pruning techniques applicable to shrubs.

Before learning how to protect trees from winter injury (E):

24. Determine how trees, shrubs and evergreen are to be protected, depending on their environment.
25. Explain various winter protection techniques in conformity to landscape standards.

Before learning how to clean up the site (F):

26. Name appropriate finishing operations.

Before learning how to write a maintenance report (H):

27. Understand the use of a maintenance form.

MODULE 19: DESIGNING A SOFT LANDSCAPING PROJECT

SIMCA: NHB-286
SESAME: 704-534

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
design a soft landscaping project
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on an actual situation, photos, a drawing or a site plan
- Using information (e.g. concerning needs and available budget)

GENERAL PERFORMANCE CRITERIA

- Observance of initial constraints
- Observance of landscape standards (Q.S.B.)
- Clarity of sketch
- Appropriate choice of plants
- Conformity to rules of aesthetics

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Analyze the data.

SPECIFIC PERFORMANCE CRITERIA

- Observance of dimensions, and customer's budget and specific needs
- Complete information

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Sketch the existing features of the site.	- Complete identification of house, patio, shed, fences and pool, if applicable - Identification of main trees and shrubs to be kept - Observance of proportions
C. Sketch various planting areas.	- Observance of balance, rhythm and simplicity
D. Determine the location of the plants.	- Consideration of exposure, height, colour, bloom time, hardiness, and width - Appropriate selection - Observance of proportions
E. Estimate project costs.	- Correct assessment of purchases: trees, shrubs, annuals and perennials, and materials (e.g. soil, amendments, ground cover) - Accurate calculation of material and plant costs
F. Explain the project.	- Clarity and accuracy of explanations - Emphasis on important elements - Description of logical sequence of steps in carrying out the project

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Understand the importance of landscaping.

Before learning how to analyze the data (A):

4. Take measurements.
5. Gather the data required to design a landscaping project.

Before learning how to sketch the existing features of the site (B):

6. Describe the basic elements and limits of a sketch.
7. Apply basic sketching techniques.
8. Transfer the measurements taken on site or from the plan onto a sketch.

Before learning how to sketch various planting areas (C):

9. Explain the principles of landscape composition (e.g. balance, rhythm, simplicity).
10. Determine the desired effect of the planting (e.g. privacy, colour, contrast, natural appearance).

Before learning how to determine the location of the plants (D):

11. Determine the type of plant that will yield the desired effect (e.g. hedge, trees, shrubs, perennials and annuals).
12. Identify the main characteristics of trees, shrubs, annuals and perennials. (See Module 18.)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to estimate project costs (E):

13. Determine the number of plants needed and their cost.
14. Consult a catalogue.
15. Do the calculations.

Before learning how to explain the project (F):

16. Be open to criticism.
17. Apply oral presentation techniques.

MODULE 20: SELLING HORTICULTURAL PRODUCTS

SIMCA: NHB-287
SESAME: 704-542

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
sell horticultural products
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on an actual or simulated situation
- Using plants or various horticultural products
- Using a calculator or a cash register
- Referring to manufacturers' instructions, catalogues, brochures or reference manuals

GENERAL PERFORMANCE CRITERIA

- Knowledge of products
- Clarity and accuracy of information given to customers
- Appropriate advice to customers
- Accuracy of calculations

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Receive a shipment of merchandise.	- Verification of conformity to order placed - Correct classification of merchandise

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Arrange product displays.	- Attractive presentation - Logical classification of products - Complete, accurate labelling
C. Inventory merchandise.	- Accuracy of calculations - Complete inventory - Clarity of written information
D. Greet customers.	- Courteous approach - Consideration of information given by customer
E. Advise customers.	- Suggestion of several possible choices - Clarity of information - Complete information - Consideration of customer's needs and preferences
F. Receive payment in cash, by cheque or credit card.	- Accuracy of calculations - Clarity of written information - Complete information - Verification of information on the cheque - Correct entry of information on credit card form - Courtesy towards customers
G. Pack or wrap the merchandise.	- Appropriate selection of wrapping or packaging - Careful handling of products - Solid and attractive wrapping or packaging

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
H. Balance the cash register.	- Accuracy of calculations - Complete, accurate entries in appropriate registers - Clarity of written information

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.
3. Recognize the importance of the salesperson's role in the organization.
4. Understand the importance of the salesperson's role in providing information.

Before learning how to receive a shipment of merchandise (A):

5. Read an order form.

Before learning how to arrange product displays (B):

6. Take into account marketing and aesthetic principles in presenting products.

Before learning how to inventory merchandise (C):

7. Do the necessary calculations.
8. Consult catalogues.
9. Interpret codes.
10. Recognize the importance of taking inventory.

Before learning how to greet customers (D):

11. Recognize the importance of a courteous approach.

Before learning how to advise customers (E):

12. Know what merchandise is available.
13. Apply horticultural techniques.
14. Maintain plants.
15. Express themselves clearly and correctly.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to receive payment in cash, by cheque or credit card (F):

16. Describe various methods of payment.

Before learning how to balance the cash register (H):

17. Identify the causes and the consequences of a cash register that does not balance.

MODULE 21: USING JOB SEARCH TECHNIQUES

SIMCA: NHB-288
SESAME: 704-552

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
use job search techniques
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- During a simulation or in connection with the search for a practicum position
- Based on a personal inventory
- Using data provided by the teacher concerning existing and prospective jobs in ornamental horticulture
- Using models of résumés and of letters of application
- Using all possible reference materials

GENERAL PERFORMANCE CRITERIA

- Quality of oral and written communication

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the steps involved in a creative job search.	- Inclusion of all steps - Logical sequence of steps - Description of important elements
B. Prepare a résumé.	- Quality of presentation (e.g. legibility of text, attractive layout, impeccable presentation)

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
C. Prepare a letter of application.	- Inclusion of relevant information (e.g. personal data, education, work experience, etc.) - Quality of written text (e.g. style, spelling, grammar) - Quality of presentation (e.g. proper typing or legible writing, attractive layout of text on page)

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning the concepts or skills associated with the specifications:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before learning how to describe the steps involved in a creative job search (A):

3. Define the concept of "creative job search."
4. Identify the attitudes that are necessary to find a job.

Before learning how to prepare a résumé (B):

5. Make a personal inventory for their job search.
6. Define the purpose and advantages of using a résumé.

Before learning how to prepare a letter of application (C):

7. Define the purpose of a letter of application.

Before learning how to undergo a screening interview (D):

8. Describe various types of interviews.
9. Prepare for an interview.
10. Explain how certain attitudes and behaviour can help them or hinder them during an interview.

Before learning how to describe effective follow-up techniques (E):

11. Define the purpose of follow-up.
12. Determine whether or not follow-up is required.

MODULE 22: ENTERING THE WORK FORCE

SIMCA: NHB-289
SESAME: 704-568

Duration: 120 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will
enter the work force.

SPECIFICATIONS

During this module, the students will:

- Find a practicum position.
- Become integrated into the workplace.
- Be aware of how their practicum will affect their perception of the work environment in terms of trade practices, aptitudes, preferences, interests and training.

LEARNING CONTEXT

PHASE 1: **Looking for a Practicum Position**

- Becoming familiar with available information.
- Setting criteria for choosing establishments.
- Identifying establishments that are likely to accept trainees.
- Applying for a practicum position.

PHASE 2: **Practising the Trade in the Workplace**

- Observing the work environment: the socio-economic environment, the structure of the establishment, equipment, technological advances, working conditions, interpersonal relations, the role of women, health and safety, participation in professional associations, etc.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2 (Cont'd):

- Observing, participating in and carrying out various tasks.
- Producing a brief report describing their observations of the work environment and of tasks carried out in the establishment.
- Evaluating themselves as workers.

PHASE 3: **Comparing their Initial Perceptions to the Actual Work Environment**

- Identifying aspects of the trade that differ from their training.
- Discussing the accuracy of their perception of the trade before and after the practicum: the workplace, trade practices.
- Discussing how their experiences will affect their careers: aptitudes, preferences and interests.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Provide the students with a journal and worksheets on which to record information during the practicum.
- Provide the students with the means to help them select an appropriate practicum position.
- Make sure the person in charge of the practicum in the establishment (the practicum supervisor) thoroughly understands the objectives of the practicum.
- Make sure the practicum supervisor writes an evaluation report on the trainee.
- Make arrangements for cooperation between the school and the establishment.
- Make it possible for students to observe and carry out tasks.
- Make sure that the trainee is under the constant supervision of a responsible individual in the establishment.
- Ensure on-site support and supervision of the students.
- Intervene if difficulties or problems arise.
- Encourage the students to participate in discussions and to express their opinions, particularly when they are looking for a practicum position or comparing their initial perceptions to their experiences in the workplace.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- Arrange, in order of preference, potential practicum positions that meet their selection criteria.
- Meet with a representative of the establishment to apply for a position as a trainee.

PHASE 2:

- Observe the establishment's work schedules and policies concerning the activities they are authorized to carry out as trainees.
- Produce a report indicating the aspects to be observed and describing the tasks observed or carried out.
- Discuss with the teacher the evaluation of their practicum by the practicum supervisor.

PHASE 3:

- Discuss with their colleagues their experiences in the workplace, using their report as the basis for discussion.
- Describe to the teacher their perceptions of themselves as workers, based on the evaluation report written by the practicum supervisor.
- Write a report on, or keep a log of, the practicum.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities in each of the phases:

1. Understand the competency to be developed as well as the suggested learning process.
2. Understand the purpose of the module.

Before undertaking the activities of Phase I:

3. Make a personal inventory of the preferences, interests, and values to take into account when selecting a practicum position. (See Module 11.)

Before undertaking the activities of Phase 2:

4. Identify the information to be recorded during the practicum.
5. Describe one observation technique.
6. Determine a way of recording their observations.
7. Describe the main components of a report containing such observations.

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