

## **PLANET's Occupational Analysis for Educational Programs: Student Competency Matrix**

### INTRODUCTION

A Competency Matrix allows students to identify knowledge and skills that are relevant to a particular field, and self-assess their progress toward expertise in these targeted areas. In 2009, faculty at Brigham Young University completed a three-year effort to develop a competency matrix for their students enrolled in Landscape Management. The goal was to include the knowledge, skills and abilities of value to Green Industry employers. Lists of competencies were obtained from the employee evaluation documents of several PLANET-member companies, as well as a review of PLANET Certification manuals. Aims of that competency matrix included:

- Direct students in selection of classes, participation in extracurricular activities, work experiences and internships that would maximize their worth to employers upon graduation;
- Provide a tool for increasing the value of internship experiences (i.e., by providing students with a knowledgeable basis upon which to negotiate for specific experiences that would produce the additional skills they need);
- Allow students to more effectively market their knowledge and experience;
- Provide a basis for more meaningful counseling with a student's faculty advisor.

In 2010, The Caviart Group LLC (<http://www.thecaviartgroup.com>) and the Professional Landcare Network (<http://www.landcarenetwork.org>) released a copyrighted document "Interpreting PLANET's Occupational Analysis for Educational Program Design". This document defines the "tasks, knowledge, and skills required to competently perform exterior landscape installation and maintenance". While the Occupational Analysis (OA) was completed in order to form the basis for certification testing, the content of the OA has obvious value to educational programs that offer degrees related to landscape contracting.

Here are just three brief examples of how the OA can be used to benefit educational programs. First, alignment of an educational program with the OA can be used to justify the relevance and importance of the program to administrators. Second, students that graduate from such a program, with both the knowledge and skills indicated by the target competencies, should largely be prepared for PLANET's Landscape Industry Certified Technician exam. And third, the competencies indicated can form the basis for defining student learning outcomes and the assessment measures that support them.

The following spreadsheets ("Softscapes", "Hardscapes", "Irrigation" and "Safety") provide the content of the 2010 OA report in the same Competency Matrix format that was developed for students at Brigham Young University. This is made available for educational use, with permission from The Caviart Group, PLANET and Brigham Young University.

# Softscapes (Plants, soil, mulches)

	No Skill	Exposure	Apprentice	Expert
<b>Components of the landscape plan</b>				
Recognizing plan symbols				
Using different scales				
Interpreting details, specs, and notes				
Calculating areas and volumes				
<b>Principles involved in layout</b>				
Measuring horizontal distances				
Marking Locations				
Placing landscape materials				
<b>Landscape equipment/tools</b>				
Operating equipment responsibly				
Using tools properly				
Equipment/tool maintenance				
<b>Methods and standards for site preparation</b>				
Preserving existing plants/structures				
Removing unwanted plants/structures				
Minimizing soil erosion				
<b>Plant Identification</b>				
ID trees, shrubs, herbaceous plants, and ground cover				
<b>Plant cultural requirements</b>				
Recognizing the relationship between plant requirements and site conditions				
<b>Methods of grading and drainage</b>				
Operating survey equipment to determine elevation				
Calculating difference in elevation				
Finish grading of site				
(CONTINUED PAGE 2)				

**No Skill:** No previous skill in the target competency

**Exposure:** Observed a competent professional demonstrating the skill

**Apprentice:** Completed relevant activity under supervision of a competent professional

**Expert:** Qualified to supervise other individuals in competency area

# Softscapes (Page 2)

	No Skill	Exposure	Apprentice	Expert
<b>Methods of soil amendment</b>				
Incorporating amendments				
<b>Methods of planting</b>				
Digging planting holes				
Praparing plant				
Placing plant				
Backfilling hole				
Staking and/or guying				
<b>Extablishing turfgrass</b>				
Laying sod				
Applying seed				
Plugging				
Sprigging				
<b>Methods of Mulching</b>				
Identifying mulch types				
Applying mulch				
<b>Fertilization</b>				
Reading fertilizer labels				
Calculating areas and volumes				
Calibrating fertilizer equipment				
Operating fertilizer equipment				
<b>Principles and methods of Pruning</b>				
Recognizing cultural needs of the plant				
Selecting appropriate pruning tools				
Performing pruning operations				
Cleaning up of debris				
(CONTINUED PAGE 3)				

**No Skill:** No previous skill in the target competency

**Exposure:** Observed a competent professional demonstrating the skill

**Apprentice:** Completed relevant activity under supervision of a competent professional

**Expert:** Qualified to supervise other individuals in competency area

# Softscapes (Page 3)

	No Skill	Exposure	Apprentice	Expert
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	No Skill	Exposure	Apprentice	Expert
<b>Turfgrass culture practices</b>				
Mowing				
Trimming				
Aerating				
Dethatching				
Edging				
Top dressing				
Overseeding				
<b>Principles of integrated Pest Management</b>				
Monitoring				
Identifying pest/disease				
Recognizing thresholds of damages				
Using appropriate control measures				
Reporting				

**No Skill:** No previous skill in the target competency

**Exposure:** Observed a competent professional demonstrating the skill

**Apprentice:** Completed relevant activity under supervision of a competent professional

**Expert:** Qualified to supervise other individuals in competency area

# Hardscapes

No Skill

Exposure

Apprentice

Expert

## Plan reading/site calculation

- Measuring plan with a scale
- Laying out the design
- Interpreting drawing symbols
- Interpreting written specifications
- Performing basic landscape math

## Equipment and tools

- Operating equipment correctly
- Performing basic equipment maintenance

## Site demolition

- Removing unwanted plants and structures

## Excavation/Grading

- Installing sub-surface drainage components
- Adjusting site topography

## Soil Structure

- ID soil types and taking proper action
- Compacting sub-grade and base material

## Aggregates

- Installing aggregate
- Installing sand

## Paving materials

- Installing paving material

## Basic wall and wood construction

- Installing wall material
- Performing basic carpentry

## Basic outdoor lighting and amenities

- Identifying components of lighting systems
- Instal site amneties(trashcan, bench, etc)

### No Skill:

No previous skill in the target competency

### Exposure:

Observed a competent professional demonstrating the skill

### Apprentice:

Completed relevant activity under supervision of a competent professional

### Expert:

Qualified to supervise other individuals in competency area

# Irrigation

No Skill	Exposure	Apprentice	Expert
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**Trenching and pipe pulling**

- Marking trench locations
- Operating trenchers and pipe pullers

**Programming controllers**

- Programming a controller as directed

**Basic Electricity**

- Recognize relationship between controllers and remote control valves
- Making proper wire connections

**Basic hydraulics**

- Measuring GPM and PSI
- Calculating pressure loss due to friction
- Recognize effect of elevation change on PSI
- Recognizing relationship between velocity and surge pressure water hammer
- Recognizing the relationship between GPM and sprinkler output

**Installation**

- Installing pipe, fittings, and components
- Backfilling and compacting
- Mounting and wiring controllers and valves
- Flushing, nozzling, and adjusting of sprinkler heads

**Maintaining**

- Troubleshooting the electrical and hydraulic components
- Replacing/repairing damaged components

*(CONTINUED PAGE 2)*

Marking trench locations				
Operating trenchers and pipe pullers				
Programming controllers				
Programming a controller as directed				
Basic Electricity				
Recognize relationship between controllers and remote control valves				
Making proper wire connections				
Basic hydraulics				
Measuring GPM and PSI				
Calculating pressure loss due to friction				
Recognize effect of elevation change on PSI				
Recognizing relationship between velocity and surge pressure water hammer				
Recognizing the relationship between GPM and sprinkler output				
Installation				
Installing pipe, fittings, and components				
Backfilling and compacting				
Mounting and wiring controllers and valves				
Flushing, nozzling, and adjusting of sprinkler heads				
Maintaining				
Troubleshooting the electrical and hydraulic components				
Replacing/repairing damaged components				
<i>(CONTINUED PAGE 2)</i>				

**No Skill:** No previous skill in the target competency

**Exposure:** Observed a competent professional demonstrating the skill

**Apprentice:** Completed relevant activity under supervision of a competent professional

**Expert:** Qualified to supervise other individuals in competency area

## Irrigation (page 2)

No Skill

Exposure

Apprentice

Expert

Winterizing system				
Charging system				
<b>Soil Types</b>				
Recognizing water, soil, & plant relationships				
<b>Plan Reading</b>				
Identifying components of an irrigation plan				
<b>Methods of Irrigation</b>				
Recognizing the delivery methods for water				

**No Skill:**

No previous skill in the target competency

**Exposure:**

Observed a competent professional demonstrating the skill

**Apprentice:**

Completed relevant activity under supervision of a competent professional

**Expert:**

Qualified to supervise other individuals in competency area

# Safety

No Skill

Exposure

Apprentice

Expert

## Knowledge of equipment

Maintenance schedule

Safety features

Operators manual

## Knowledge of motor vehicles

Maintenance schedule/pre-trip inspection

Operators manual

Combination vehicles

## Knowledge of safe working practices

Proper lifting techniques

Methods of material handling

Personal protective equipment

## Knowledge of product information

Label

MSDS

## Additional skills in:

Performing safety check for tools/equipment

Recording in logbooks

Transporting equipment and materials

Storing tools properly

Performing site inspections to ID hazards

Reading labels, MSDS and operator manuals

Establishing safe work areas

Initiating emergency response

Ensuring underground utilities are identified, located, and marked before excavation

### No Skill:

No previous skill in the safety target

### Exposure:

Observed safe demonstration by a competent professional

### Apprentice:

Safely demonstrated skill under supervision of a competent professional

### Expert:

Can safely supervise other individuals in competency area