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 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
Components of the landscape plan				
Recognizing plan symbols				
Using different scales				
Interpreting details, specs, and notes				
Calculating areas and volumes				
Principles involved in layout				
Measuring horizontal distances				
Marking Locations				
Placing landscape materials				
Landscape equipment/tools				
Operating equipment responsibly				
Using tools properly				
Equipment/tool maintenance				
Methods and standards for site preparation				
Preserving existing plants/structures				
Removing unwanted plants/structures				
Minimizing soil erosion				
Plant Identification				
ID trees, shrubs, herbaceous plants, and ground cover				
Plant cultural requirements				
Recognizing the relationship between plant requirements and site conditions				
Methods of grading and drainage				
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
Methods of soil amendment				
Incorporating amendments				
Methods of planting				
Digging planting holes				
Praparing plant				
Placing plant				
Backfilling hole				
Staking and/or guying				
Extablishing turfgrass				
Laying sod				
Applying seed				
Plugging				
Sprigging				
Methods of Mulching				
Identifying mulch types				
Applying mulch				
Fertilization				
Reading fertilizer labels				
Calculating areas and volumes				
Calibrating fertilizer equipment				
Operating fertilizer equipment				
Principles and methods of Pruning				
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
Turfgrass culture practices				
Mowing				
Trimming				
Aerating				
Dethatching				
Edging				
Top dressing				
Overseeding				
Principles of integrated Pest Management				
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
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				
Recogmizing 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)

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				
Soil Types				
Recognizing water, soil, & plant relationships				
Plan Reading				
Identifying components of an irrigation plan				
Methods of Irrigation				
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 properlay				
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