



WHITE PAPER

**On-line Preparatory Solutions for the
LEED Green Associate Credential**

**Prepared for the
United States Green Building Council**

June 16th, 2011



Executive Summary:

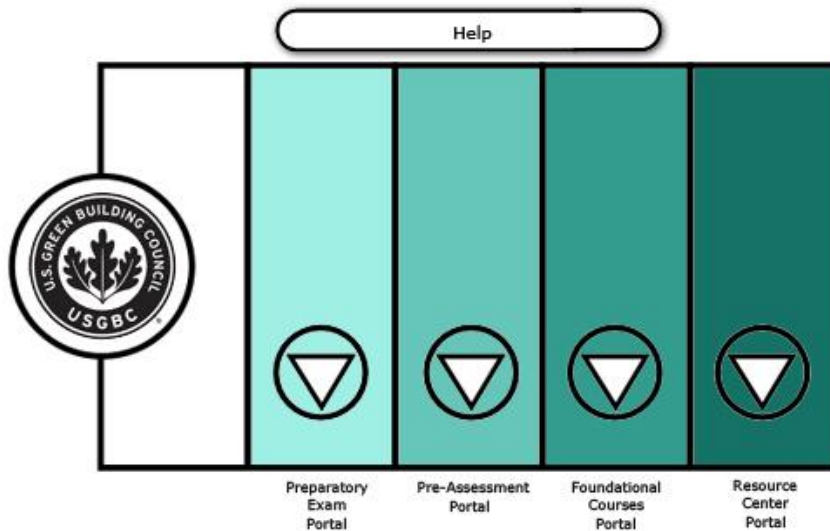
The Custom Curriculum Division of Pearson Learning Solutions was engaged to conduct a needs analysis for United States Green Building Council (USGBC). The scope of this document provides an Executive Summary, GAP analysis, and proposed solutions for the development processes and components required for an online LEED Green Associate Certification.

Goals

Our development endeavor is to provide the United States Green Building Council a strong branding and leadership stance for their online credentialing efforts. Our proposed solution(s) will be scalable and will provide a 24/7 “one-stop” environment for career-readiness learners.

Proposed Solution: LEED Central

Our needs analysis indicates a single-site, online, entry-point solution for those wanting to prepare for an online LEED (Leadership in Energy and Environmental Design) Green Associate Certification. This initiative will provide self-paced learning and unlimited practice opportunities for those who want to attain professional accreditation for a LEED Green Associate Certification. LEED Central will offer access to a Help Portal, a Preparatory Examination Portal, a Pre-Assessment Examination Portal, a Foundational Course(s) Portal, and a Resource Center Portal. These portals and associated content will be designed for those who are new to the field as well as experienced users.



LEED Central



Venues

LEED Central will be designed to offer the United States Green Business Council dual sourcing opportunities. They are:

- **LEED Central Direct:** An in-house scalable exam platform that offers preparatory certification products directly to a consumer via an online portal.
- **LEED Central Scholar:** A scalable exam platform that offers preparatory certification products for institutional/course adopters (primarily education). This platform will be designed to be compatible with the following Learning Management Systems: Blackboard, WebCt, Angel Learning, WPS, Pearson Learning Studio, Moodle, Course Compass, and Desire2Learn.

Target Audience

Our online initiatives will be developed to reach a variety of audiences with varying experience levels. New online courseware will be designed to increase a student's intellectual and career development in the Green Business Sector. Lesson content will be developed to rigorously challenge and engage students in their educational pursuits. This curriculum offers a balanced program for all learners and is adjustable enough to permit a wide variation of individual student participation.

Critical to Quality

Fidelity in testing and instructional alignment are essential standards required for the development and delivery of LEED educational materials. It is suggested that the standards provided by the American Educational Research Association (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education be used when creating all testing materials. *Further information can be found by reviewing Table of Contents: Standards of Quality.*

When creating new online courseware materials, a comprehensive plan must be initiated. We will employ the ADDIE model to create compelling and instructionally sound educational materials. Using the ADDIE model will allow us to deliver consistent, high-quality on-line material to learners at numerous locations. *Further information can be found by visiting Appendix A: The ADDIE Model, Appendix B: Instructional Alignment and Appendix D: Design Document – Sustainable Sites.*

Instructional Methodology

In recent years, profound scientific breakthroughs in the areas of brain science and memory have occurred. Research indicates a biochemical processes that cause long-term memory formation has been found. Based on these neurological discoveries, researchers at one of the nation's top research universities have developed a mechanism that can systematically trigger the brain to store information into long-term memory.



In 2001, the key contributor to the discovery of the "memory trigger" carried forward his research by working with engineers to create a software platform that would propel eLearning into the 21st century. The result is Amplifire. Amplifire's accelerated memory protocol™ - the world's only learning application that can rapidly and systematically move large volumes of content into learners' long-term memories and verify knowledge transfer. *For further information please see Appendix C: amplifire.*

Delivery Methodology

A dashboard will be developed to deliver educational materials and provide the learner with the status of his/her current educational endeavors. A dashboard is the end of a complex chain of information gathering and delivery of on-line data. Data is gathered from various sources into a data warehouse or operational data store and delivered per request to the learner using an online portal. This tool presents a unified view of key metrics associated with a specific learner's current activities and scores as well as access to currently downloaded educational materials. *For more information please see Table of Contents: Delivery Methodology*

Earning the LEED AP after the LEED Green Associate:

The scope of this document addresses the issues concerning the development and delivery of online preparatory examinations leading to a LEED Green Associate Credential. Should the USGBC want to provide preparatory online exams for additional AP credentialing, this document can be used as a foundational guide to construct and deliver associated materials in a timely and efficient manner.

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Overview

The United States Green Business Council, through the Green Building Certification Institute, provides professional accreditation for those involved in their company's building practices as well as those directly involved in green building projects. LEED is a framework for design, construction, and evaluation. The LEED certification program is the nationally accepted benchmark for the design, construction, and operation of high-performance green buildings.

The Green Building Certification Institute (GBCI) provides LEED Professional Accreditation for the following areas:

- LEED Green Associate
- LEED Accredited Professional (AP)
- LEED Fellow (work in progress)

Green Associate Credentialing Content

Currently, these seven categories are assessed during the Green Associate credentialing process:

1. Sustainable Sites
2. Water Efficacy
3. Energy and Atmosphere
4. Materials and Resources
5. Indoor Environmental Quality
6. Innovation in Design
7. Regional Priority (*Currently being finalized by USGBC*)
 - A. USGBA Chapters that address important regional issues

Professional Credentialing Provider

The Green Building Certification Institute develops and administers the LEED Professional Credential exams, which include the LEED Green Associate and the LEED AP with specialty credentials, as well as the LEED for Homes Green Rater and LEED Project Reviewer professional certificates.

The Green Building Certification also oversees the Credential Maintenance Program (CMP) for LEED Professionals. This continuing education requirement keeps LEED professionals at the forefront of the rapidly evolving green building industry, driving ongoing excellence in the marketplace and ensuring that LEED professionals are the most qualified in the field.



Gap Analysis

A *Gap analysis* is a tool that helps a company to compare its actual performance with its potential performance. At its core are two questions: "Where are we?" and "Where do we want to be?"

The goal of Gap analysis is to identify the gap between the optimized allocation and integration of the inputs (resources) and the current level of allocation. This helps provides an organization with insights into areas that could be improved. The Gap analysis process involves determining, documenting, and approving the variance between an organization's requirements and its current capabilities. Gap analysis naturally flows from benchmarking and other assessments. After the general expectation of performance from the organization is understood, it is possible to compare that expectation with the organization's current level of performance. This comparison becomes the Gap analysis. Such analysis can be performed at the strategic or operational level of an organization.

A formal Gap Analysis of the United States Green Building Council credentialing opportunities was performed and revealed the following:

Current Practice/State	Proposed Practice/State	Resulting Gap	Proposed Solutions
Credentialing for a LEED Green Associate is provided by Green Building Certification Institute (GBCI)	NA	NA	Remains the same
Practice for LEED Green Associate Credential found in several locations	Online aggregated location	Needs single source	LEED Central: Preparatory Exam Portal Pre-Assessment Exam Portal Foundational Courses Portal
Printed educational materials in various locations	Online aggregated location	Needs single source	LEED Central: Resource Center Portal
Online educational materials found in various locations	Online aggregated location	Needs single source	LEED Central: Foundational Courses Portal
Foundational Courses non-existent	Online aggregated location; hosting provider determines whether content is sequenced or non-ordered.	Needs single source	LEED Central: Foundational Courses Portal
Learner Reporting and Management features non-existent	Online aggregated location	Needs single source	LEED Central using dashboard component and associated LMS integration



Current Instructional Materials

Currently, the United States Green Building Council provides educational materials for the preparation of their Green Associate Credential in various formats. These formats are printed materials (including PDFs), online courses, and online materials associated with the online courses.

Printed Materials

Green Associate Study Guide w/ Green Building & LEED Core Concepts Guide
Current as of 4/1/2011

Primary References:			
	Source	Type	Location
<i>Green Associate Study Guide w/ Green Building & LEED Core Concepts Guide</i>	USGBC (2009)	 Publication Combos	http://www.usgbc.org/Store/PublicationsList_new.aspx?CMSPageID=1518
<i>Green Office Guide: Integrating LEED into your Leasing Process, Section 2.4</i>	USGBC (2009)		http://www.usgbc.org/ShowFile.aspx?DocumentID=6429
LEED 2009 for New Construction and Major Renovations Rating System	USGBC (2009)		http://www.usgbc.org/ShowFile.aspx?DocumentID=5546
<i>LEED for Existing Buildings: Operations and Maintenance Reference Guide, Introduction</i>	USGBC (2008)		http://www.usgbc.org/ShowFile.aspx?DocumentID=3353
<i>LEED for Existing Buildings: Operations and Maintenance Reference Guide, Glossary</i>	USGBC (2008)		http://www.usgbc.org/ShowFile.aspx?DocumentID=3177
LEED for Home Rating System	USGBC (2008)		http://www.usgbc.org/ShowFile.aspx?DocumentID=3638
Cost of Green Revisited	Davis Langdon (2008)		http://www.davislangdon.com/uploads/images/publications/USA/The%20Cost%20of%20Green%20Revisited.pdf
<i>Sustainable Building Technical Manual: Part 2</i>	Anthony Bernheim and William Reed (1996)		http://www.gbci.org/Libraries/CredentialExamReferences/Sustainable-Building-Technical-Manual-Part-II.sflb.ashx
The Treatment by LEED® of the Environment Impact of HVAC Refrigerants	LEED Technical Scientific Committee (2004)		https://www.usgbc.org/Docs/LEEDtsac/TSAC_Refrig_Report_Final-Approved.pdf
Guidelines on Innovation and Design (ID) Credits	USGBC (2004)		http://www.usgbc.org/Docs/LEEDdo



			cs/IDcredit_guidance_final.pdf
Guidelines for CIR Customers	USGBC (2007)		http://www.bicsi.org/pdf/gbta/CIR%20Guidelines.pdf
Additional References			
USGBC Website <ul style="list-style-type: none"> • LEED Project Registration • LEED Certification Content • Purpose of LEED Online 	United States Green Business Council		www.usgbc.org
USGBC Website/LEED <ul style="list-style-type: none"> • LEED Rating System • Reference Guide Introductions 	United States Green Business Council - LEED Portal		www.usgbc.org/leed
Ancillary References:			
<i>Energy Performance of LEED® for New Construction Buildings: Final Report</i>	Kathy Turner and Mark Frankel (2008)		http://www.usgbc.org/ShowFile.aspx?DocumentID=3930
Foundations of the Leadership in Energy and Environmental Design Environmental Rating System: A Tool for Market Transformation	LEED Steering Committee (2006)		http://www.gbci.org/Files/References/Foundations-of-the-Leadership-in-Energy-and-Environmental-Design-Environmental-Rating-System-A-Tool-for-Market-Transformation.pdf
AIA Project Delivery Guide	AIA		http://www.aia.org/contractdocs/AIAS077630
Review of ANSI/ASHRAE Standard 62.1-2004: Ventilation for Acceptable Indoor Air Quality	Workplace Safety, Inc.		http://www.workplace-hygiene.com/IAQ.html
Best Practices ISO-14021:Self-Declared Environmental Claims	Kun-Mo Lee and Haruo Uehara (2003)		http://www.ecodesign-company.com/documents/BestPracticeISO14021.pdf
Bureau of Labor Statistics	Bureau of Labor Statistics		www.bls.gov
International Code Council	International Code Council		www.iccsafe.org
American with Disabilities Act (ADA) Standards for Accessible Design	American with Disabilities Act – US Government		www.ADA.gov
GSA 2003 Facilities Standards	GSA, 2003		http://www.gsa.gov/portal/content/104821



Guide to Purchasing Green Power	EPA, 2004		http://www.epa.gov/greenpower/documents/purchasing_guide_for_web.pdf
LEED 2009 for Operations and Maintenance Rating System	USGBC, 2009		http://www.usgbc.org/ShowFile.aspx?DocumentID=8887

Legend: Publication Adobe PDF World Wide Web

Printed Materials (cont.)

LEED Reference Guide for Green Building Design and Construction
Current as of 4/1/2011

Additional Reference Guides:				
	Source	Type	Location	Cost
<i>LEED Reference Guide for Green Building Design and Construction</i>	USGBC (2009)		https://www.usgbc.org/Store/PublicationsList_News.aspx?CMSPageID=1518	Hardcopy: Non-member: \$195 Member: \$160 Ebook: Non-member: \$180 Member: \$150 Full-time student (Hardcopy or ebook): \$160
<i>LEED Reference Guide for Green Building Interior Design and Construction</i>	USGBC (2009)		https://www.usgbc.org/Store/PublicationsList_News.aspx?CMSPageID=1518	Hardcopy: Non-member: \$195 Member: \$160 Ebook: Non-member: \$180 Member: \$150 Full-time student (Hardcopy or ebook): \$160
<i>LEED Reference Guide for Green Building Operations and Management</i>	USGBC (2009)		https://www.usgbc.org/Store/PublicationsList_News.aspx?CMSPageID=1518	Hardcopy: Non-member: \$195 Member: \$160 Ebook: Non-member: \$180 Member: \$150 Full-time student (Hardcopy or ebook): \$160
<i>LEED for Homes Reference Guide</i>	USGBC (2009)		https://www.usgbc.org/Store/PublicationsList_News.aspx?CMSPageID=1518	Hardcopy Only: Non-member: \$120 Member: \$100 Full-time student \$100



Legend: Publication



Adobe PDF




World Wide Web

On-line Materials

LEED 201 Core Concepts and Strategies

Current as of 4/13/2011

On-line: LEED 201: LEED Core Concepts and Strategies	
Location Type Level	Content
Location: http://lms.usqbc.org/lms/file.php/10/moddata/scorm/9/Vegas.html?course=data/course_566_000.xml&scorm=1.2#7 	<p>Legend: CYU – Check Your Understanding</p> <p><i>LEED Core Concepts and Strategies</i></p> <ul style="list-style-type: none"> 1.1. Introduction <ul style="list-style-type: none"> 1.1.1. Integrated Approach 1.2. LEED <ul style="list-style-type: none"> 1.2.1. Introduction <ul style="list-style-type: none"> 1.2.1.1. Priorities for LEED 1.2.1.2. LEED Rating Systems 1.2.1.3. Organization of LEED 1.2.1.4. Credit Categories 1.2.1.5. Point Distribution Across Credit Categories 1.2.1.6. LEED Certification Levels 1.2.1.7. CYU—Introductory Quiz 1.2.1.8. Certification Process 1.2.1.9. Certification Tools 1.2.1.10. Accreditation 1.2.1.11. CYU—Certification Process Quiz 1.3. Sustainable Sites <ul style="list-style-type: none"> 1.3.1. Introduction to Sustainable Sites 1.3.2. Sustainable Site Objectives <ul style="list-style-type: none"> 1.3.2.1. CYU Think About It: Sustainable Sites 1.3.2.2. Sustainable Sites Intents and the Integrative Approach 1.3.2.3. Sustainable Sites Concepts Explore-It 1.3.3. Introduction to Location and Planning <ul style="list-style-type: none"> 1.3.3.1. Location and Planning Goals 1.3.3.2. Location and Planning Explore-It 1.3.3.3. Examples of Location Strategies 1.3.3.4. Examples of Density and Diversity Strategies 1.3.3.5. Examples of Accessibility Strategies 1.3.3.6. Case Studies for Location and Planning 1.3.3.7. LEED Credits Related to Choosing a Smart Location 1.3.3.8. CYU—Location and Planning Quiz 1 1.3.3.9. CYU—Location and Planning Quiz 2 1.3.4. Introduction to Site Design and Management <ul style="list-style-type: none"> 1.3.4.1. Site Design and Management Goals 1.3.4.2. Site Design and Management Explore-It 1.3.4.3. Examples of Previously Developed Sites 1.3.4.4. Examples of Preserve Habitat and Wetlands 1.3.4.5. Examples of Protect Surface Waters and Aquatic Ecosystems 1.3.4.6. Metrics: Protecting Surface Waters 1.3.4.7. Examples of Reduce Heat Island Effect 1.3.4.8. Metric: Solar Reflectance Index (SRI) 1.3.4.9. LEED Credits Related to Reduce Heat Islands 1.3.4.10. Examples of Strategies to Reduce Light Pollution 1.3.4.11. Examples of Protecting Human Health 1.3.4.12. Examples of Reducing Environmental Impact 1.3.4.13. Site Design and Management Case Studies 1.3.4.14. Site Design and Management Quiz 1 1.3.4.15. Site Design and Management Quiz 2 1.3.5. Summary Sustainable Sites <ul style="list-style-type: none"> 1.3.5.1. Synergies for Sustainable Sites
Type: Web Based Course	
Level: Platinum Slides w/ text highlighted when called out, audio, photo's & Branching Scenario's	



	<ul style="list-style-type: none">1.3.5.2. Reference Standards for Sustainable Sites1.3.5.3. Incentives for Sustainable Sites1.3.5.4. Summary of Sustainable Sites Intents1.3.5.5. Goals for Sustainable Sites Quiz1.3.5.6. Strategies for Sustainable Sites Quiz1.3.5.7. Measures for Sustainable Sites Quiz
	<ul style="list-style-type: none">1.4. Water Efficiency<ul style="list-style-type: none">1.4.1. Introduction to Water Efficiency1.4.2. Water Efficiency Objectives<ul style="list-style-type: none">1.4.2.1. Water Efficiency—Think About It1.4.2.2. Water Efficiency Intents and the Integrative Approach1.4.2.3. Concepts of Water Efficiency Explore-It1.4.3. Introduction to Indoor Water Efficiency<ul style="list-style-type: none">1.4.3.1. Water Efficiency Performance Benchmarks1.4.3.2. Indoor Water Metrics1.4.3.3. Indoor Water Goals1.4.3.4. Indoor Water Efficiency Explore-It1.4.3.5. Fixtures Examples1.4.3.6. Non-Portable Water Use Examples1.4.3.7. Indoor Water Efficiency Case Studies1.4.3.8. LEED Credits Related to Reduce Potable Water Demand1.4.3.9. CYU - Indoor Water Efficiently Quiz1.4.4. Introduction to Outdoor Water Efficiency<ul style="list-style-type: none">1.4.4.1. Outdoor Water Goals1.4.4.2. Outdoor Water Efficiency Explore-It1.4.4.3. Landscaping Examples1.4.4.4. Irrigation Technology Examples1.4.4.5. Non-Potable Water Examples1.4.4.6. Monitoring Examples1.4.4.7. Outdoor Water Efficiency Case Studies1.4.4.8. CYU—Outdoor Water Efficiency Quiz1.4.5. Introduction to Process Water Efficiency<ul style="list-style-type: none">1.4.5.1. Process Water Goals1.4.5.2. Process Water Efficiency Explore-It1.4.5.3. Chemical Management1.4.5.4. Non-Potable Water1.4.5.5. Sub-Metering Examples1.4.5.6. Process Water Case Studies1.4.5.7. CYU—Process Water Efficiency Quiz1.4.6. Water and Energy Synergies<ul style="list-style-type: none">1.4.6.1. Incentives, Recognition, and Regulations1.4.6.2. Summary of Water Efficiency Intents1.4.6.3. CYU—Goals for Water Efficiency Quiz1.4.6.4. CYU—Strategies for Water Efficiency Goals Quiz1.4.6.5. CYU—Measures for Water Efficiency Quiz1.4.7. Impacts Activity I<ul style="list-style-type: none">1.4.7.1. Explore Transportation and Water Strategy Impacts1.4.7.2. CYU - Think About It: Transportation and Water1.4.8. Energy and Atmosphere<ul style="list-style-type: none">1.4.8.1. Introduction to Energy and Atmosphere1.4.8.2. Energy and Atmosphere Objectives1.4.8.3. CYU—Energy and Atmosphere Think About It1.4.8.4. Energy and Atmosphere Intents and the Integrative Approach1.4.8.5. Energy and Atmosphere Concepts Explore-It1.4.9. Energy Demand<ul style="list-style-type: none">1.4.9.1. Introduction to Energy Demand1.4.9.2. Energy Demand Goals1.4.9.3. Energy Demand Explore-It1.4.9.4. Examples of Site Design and Orientation1.4.9.5. Examples of Shading1.4.9.6. Examples of Building Design and Massing1.4.9.7. Examples of Using Daylighting1.4.9.8. Examples of Using Natural Ventilation1.4.9.9. Energy Demand Case Studies1.4.9.10. LEED Credits Related to Reduce Energy Demand1.4.9.11. CYU—Energy Demand Quiz



	<ul style="list-style-type: none">1.4.10. Energy Efficiency<ul style="list-style-type: none">1.4.10.1. Introduction to Energy Efficiency1.4.10.2. Energy Efficiency Goals1.4.10.3. Energy Efficiency Explore-It1.4.10.4. Examples of Whole Building Energy Simulation1.4.10.5. Examples of Energy-Saving Equipment1.4.10.6. Examples of Efficient Lighting Designs and Lighting Systems1.4.10.7. Examples of High-Performance Water Heating1.4.10.8. Example of Energy-Efficient Computers and Appliances1.4.10.9. Energy Efficiency Case Studies1.4.10.10. CYU—Energy Efficiency Quiz1.4.11. Energy Supply<ul style="list-style-type: none">1.4.11.1. Introduction to Energy Supply1.4.11.2. Energy Supply Goals1.4.11.3. Energy Supply Explore-It1.4.11.4. Examples of Solar PV1.4.11.5. Examples of Off-Site Generation1.4.11.6. Energy Supply Case Studies1.4.11.7. LEED Credits Related to Purchase Offsite Renewable Energy1.4.11.8. CYU—Energy Supply Quiz1.4.12. Energy Performance<ul style="list-style-type: none">1.4.12.1. Introduction to Energy Performance1.4.12.2. Energy Performance Goals1.4.12.3. Energy Performance Explore-It1.4.12.4. Examples of Commissioning1.4.12.5. Examples of Monitoring and Verification1.4.12.6. Energy Performance Case Studies1.4.12.7. CYU—Energy Performance Quiz1.4.13. Energy and Atmosphere<ul style="list-style-type: none">1.4.13.1. Energy and Atmosphere Synergies1.4.13.2. Energy and Atmosphere Incentives1.4.13.3. Energy and Atmosphere Summary1.4.13.4. CYU—Goals for Energy Atmosphere Quiz1.4.13.5. CYU—Strategies for Energy and Atmosphere Quiz1.4.13.6. CYU—Measure for Energy and Atmosphere Quiz1.5. Materials and Resources<ul style="list-style-type: none">1.5.1. Introduction to Materials and Resources<ul style="list-style-type: none">1.5.1.1. Materials and Resources Objectives1.5.1.2. Materials and Resources Think About It1.5.1.3. Materials and Resources Intents and the Integrative Approach1.5.1.4. Materials and Resources Concepts Explore-It1.5.1.5. Solid Waste1.5.2. Environmental Impact<ul style="list-style-type: none">1.5.2.1. Introduction to Environmental Impacts1.5.2.2. Environmental Impact of Materials Goals1.5.2.3. Environmental Impact of Materials Explore-It1.5.2.4. Examples of Reuse Materials Strategies1.5.2.5. LEED Credits Related to Material Reuse1.5.2.6. Use Recycled Content1.5.2.7. Examples of Recycled Content1.5.2.8. Examples of Renewable Materials1.5.2.9. Examples of Sustainable Products/Purchasing1.5.2.10. Examples of Reducing Impacts of Food Production/Distribution1.5.2.11. Environmental Impact of Materials Case Studies1.5.2.12. CYU—Environmental Impacts of Materials Quiz Question 11.5.2.13. CYU—Environmental Impacts of Materials Quiz Question 21.5.3. Reduce Waste<ul style="list-style-type: none">1.5.3.1. Introduction to Reducing Waste1.5.3.2. Reducing Waste Goals1.5.3.3. Reducing Waste Explore-It1.5.3.4. Recycling Programs1.5.3.5. Reducing Waste Case Studies1.5.3.6. CYU—Reduce Waste Quiz1.5.4. Materials and Resources Synergies<ul style="list-style-type: none">1.5.4.1. Materials and Resources Synergies
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	<ul style="list-style-type: none">1.5.4.2. Materials and Resources Policies1.5.4.3. Materials and Resources Summary1.5.4.4. CYU—Goals for Materials and Resources Quiz Question 11.5.4.5. CYU—Goals for Materials and Resources Quiz Question 21.5.4.6. CYU—Goals for Materials and Resources Quiz Question 31.6. Indoor Environmental Quality<ul style="list-style-type: none">1.6.1. Introduction to Indoor Environmental Quality<ul style="list-style-type: none">1.6.1.1. Indoor Environmental Quality Objectives1.6.1.2. Indoor Environmental Quality Think About It1.6.1.3. Indoor Environmental Quality Intents and the Integrative Approach1.6.1.4. Indoor Environmental Quality Concepts Explore-It1.6.2. Indoor Air Quality1.6.3. Indoor Environmental Quality Intents and the Integrative Approach<ul style="list-style-type: none">1.6.3.1. Indoor Environmental Quality Concepts Explore-It1.6.3.2. Introduction to Indoor Air Quality1.6.3.3. Indoor Air Quality Explore-It1.6.3.4. Examples of Well Ventilated Building1.6.3.5. LEED Credits Related to Design well-Ventilated Buildings1.6.3.6. Examples of Green Construction Practices1.6.3.7. Examples of Reducing Moisture1.6.3.8. Examples of Using Appropriate Materials1.6.3.9. Examples of Reducing Contaminants1.6.3.10. Examples of Controlling Tobacco Smoke Emissions1.6.3.11. Indoor Air Quality Case Studies1.6.3.12. CYU- Indoor Air Quality Quiz1.6.4. Occupant Comfort and Productivity<ul style="list-style-type: none">1.6.4.1. Introduction to Occupant Comfort and Productivity1.6.4.2. Occupant Comfort and Productivity Explore-It1.6.4.3. Examples of Thermal Comfort1.6.4.4. Examples of Lighting Control1.6.4.5. Examples of Daylighting and Views1.6.4.6. Examples of Acoustical Controls1.6.4.7. Occupant Comfort and Productivity Case Studies1.6.4.8. CYU—Occupant Comfort Productivity Quiz1.6.5. Regulations Summary<ul style="list-style-type: none">1.6.5.1. Regulations1.6.5.2. Indoor Environmental Quality Summary1.6.5.3. CYU—Indoor Environmental Quality Quiz: Goals1.6.5.4. CYU—Indoor Environmental Quality Quiz: Strategies1.6.5.5. CYU—Indoor Environmental Quality Quiz: Measures1.7. Impact Activity 2<ul style="list-style-type: none">1.7.1.1. Explore Transportation, Water, and Energy Strategy Impacts1.7.1.2. Think About It: Transportation, Water, and Building Systems1.8. Innovation in Design<ul style="list-style-type: none">1.8.1. Introduction to Innovation in Design<ul style="list-style-type: none">1.8.1.1. Innovation in Design Objectives1.8.1.2. CYU—Innovation in Design: Think About It1.8.1.3. Innovation in Design Intents and the Integrative Approach1.8.1.4. Innovation in Design Concepts Explore-It1.8.1.5. Examples of Exceptional Performance1.8.1.6. Innovation in Design Case Studies1.8.1.7. Innovation in Design Strategy Credits1.8.1.8. Examples of Innovative Performance1.9. Summary<ul style="list-style-type: none">1.9.1. Synergies and Integrative Design Review1.9.2. Action Items1.9.3. Introduction to Case Studies by Market Sector Summary<ul style="list-style-type: none">1.9.3.1. New Construction Case Studies1.9.3.2. Commercial Interiors Case Studies1.9.3.3. Core and Shell Case Studies1.9.3.4. Existing Building Case Studies1.9.3.5. Home Case Studies1.9.3.6. Schools Case Studies1.9.3.7. Review1.10. Case Studies
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	<ul style="list-style-type: none"> 1.10.1. 4240 Architecture, Inc. 1.10.2. 2008 Southern Living Idea 1.10.3. Sidewell Friends Middle School 1.10.4. REAL Model Home 1.10.5. Provincetown Art Association 1.10.6. Morrisania Homes 1.10.7. Interface Showroom and Office 1.10.8. Gish Apartments 1.10.9. Fossil Ridge High School 1.10.10. William J. Clinton Presidential Library 1.10.11. Clearview Elementary 1.10.12. CCI Center 1.10.13. Blackstone Station Office 1.10.14. Banner Bank Building 1.10.15. Aldo Leopold Legacy Center 1.10.16. Tepeyac Haven 1.10.17. Nulhegan Administration Building 1.10.18. REI Portland Retail Center 1.10.19. Signature Center 1.11. LEED Exam Preparation Resources <ul style="list-style-type: none"> 1.11.1. LEED Credential Candidate 1.11.2. USBC Exam Support 1.11.3. Green Building and LEED 1.11.4. LEED Credential Study Guides 1.11.5. LEED Rating Systems 1.11.6. LEED Reference Guides 1.12. Other Resources <ul style="list-style-type: none"> 1.12.1. U.S Building Council 1.12.2. LEED 1.12.3. USGBC Education 1.12.4. USGBC Membership 1.12.5. USGBC Chapters 1.12.6. Green Building Certification 1.12.7. LEED Project Case Studies 1.12.8. USGBC Publications 1.13. Glossary
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Additional On-line Sites

Email from Rob Hink: in Classroom Green Buildings & Preparing for the LEED Green Associate - Spring 2011(a):
 Current as of 5/2/2011

Additional On-line Sites:			
	Source	Type	Location
Pharos: A comparative, multi-attribute analysis of impacts in the form of numerical and color-coded scores.	Rob Hink		http://www.pharosproject.net/
SMART: A product certification system, evaluates products and the manufacturing process (ANSI certified, consensus based)	Rob Hink		http://www.sustainableproducts.com/mts/smartstandards.html
Cradle to Cradle™ Certification: Similar to SMART, but not consensus based	Rob Hink		http://www.mbcc.com/
The National Institute of Standards and Technology (NIST) BEES: A side by side comparisons of similar products	Rob Hink		http://www.nist.gov/el/economics/BEESSoftware.cfm/



On-line Materials (cont'd)

LEED 205: Green Buildings and Preparing for the LEED Green Associate
Current as of 4/13/2011


On-line: LEED 205 Green Buildings and Preparing for the LEED Green Associate—Spring 2011(a)	
Length	8-week course, 1 unit per week
	Orientation to Online Learning Agenda
Unit 1	Intro to Sustainable Design, Green Building, and LEED
Unit 2	Sustainable Sites
Unit 3	Water Efficiency
Unit 4	Energy and Atmosphere
Unit 5	Materials and Resources
Unit 6	Indoor Air Quality
Unit 7	Innovation and Preparing for the Green Associate Exam
Unit 8	LEED Green Associate Exam Prep

Each lesson is comprised of the following elements:

On-line: LEED 205 Green Buildings and Preparing for the LEED Green Associate—Spring 2011(a)	
Lesson	
Welcome	<ul style="list-style-type: none">• Introduction• Learning Objectives• Unit Content<ul style="list-style-type: none">Module ReviewWatch Video PresentationReadingsActivitiesDiscussionSelf-QuizzesHelp



Detailed examination of the LEED 205 course is as follows:

On-line: LEED 205: 8-Week Faculty-Led Online Course		
Location Type Level	Title	Content
Location: http://uqotclass.org/View/ClassroomContent/welcome.view.cfm?ClassroomId=337&UnitID=1147 	Pre-Course Welcome Unit 1: Introduction to Sustainable Design, Green Building, and LEED	<ul style="list-style-type: none"> • Agenda • Course Objectives • Introduction • Learning Objectives • Unit Agenda • Module Completion <ul style="list-style-type: none"> • Module 1: Introduction, and Module 2: LEED • Video <ul style="list-style-type: none"> • "High Performance Building: Performance by Design" • Readings <ul style="list-style-type: none"> • Intro to LEED on USGBC Website • Green Building Facts • <i>Green Building and LEED Core Concepts Guide</i> (pages 1-24) • Intro section to <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 1: Think About it • Discussion <ul style="list-style-type: none"> • Post to self-introduction • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 1: Self-Quiz • Help
Type: Web Based Course		
Level: Gold w/links to LEED 201: LEED Core Concepts and Strategies	Unit 2: Sustainable Sites— Concepts, Goals, and Strategies	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 3: Sustainable Sites • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: "Sustainable Communities and Mass Transit" • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 25-35) • Reducing Stormwater Costs Through Low-Impact Development Strategies and Practices • Sustainable Sites credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 2: Think About it • Unit 2: Where You Live • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others' ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 2: Self-Quiz • Help



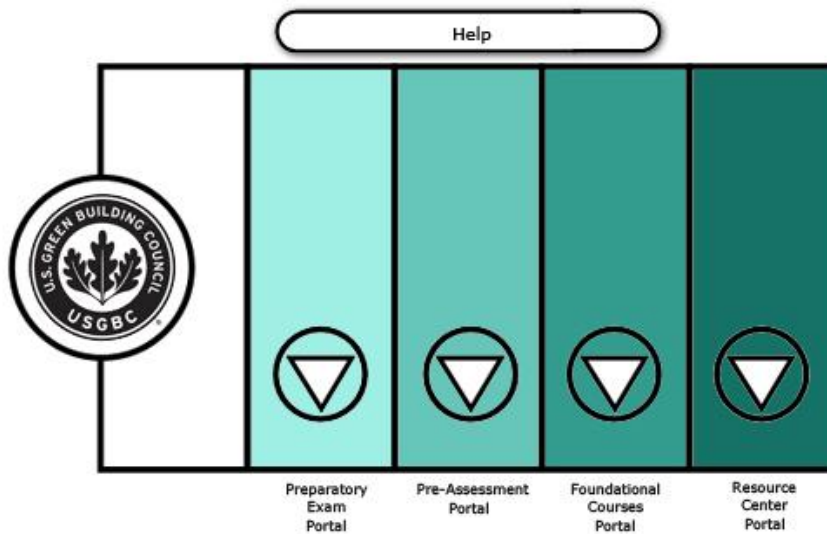
<p>Unit 3: Water Efficiency— Concepts, Goals, and Strategies</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 4: Water Efficiency, Module 5: Impacts Activity 1 • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: “Water-Centric Site Design: The Path to More Sustainable Places” • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 37-42) • Water Efficiency credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 3: Think About it • Unit 3: Test Your WaterSense • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 3: Self-Quiz • Help
<p>Unit 4: Energy and Atmosphere —Concepts, Goals, and Strategies</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 6: Energy and Atmosphere • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: “Toward Zero Energy and Beyond: Solar- and Wind-Powered Buildings” • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 43-51) • Energy and Atmosphere credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 4: Think About it • Unit 4: Self-Review Quiz • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 4: Self-Quiz • Help
<p>Unit 5: Materials and Resources— Concepts, Goals, and Strategies</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 7: Materials and Resources • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: “Green Products and Technology” • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 53-57) • Materials and Resources credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 5: Think About It • Unit 5: “Story of Stuff” • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 5: Self-Quiz • Help



<p>Unit 6: Indoor Environmental Quality— Concepts, Goals, and Strategies</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 8: Indoor Environmental Quality, Module 9: Impacts Activity 2 • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: “Cutting-Edge Green Interiors” • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 59-63) • Indoor Environmental Quality credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 6: Think About it/Walk Around • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 6: Self-Quiz • Help
<p>Unit 7: Innovation and Preparing for the Green Associate Exam</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Module Completion <ul style="list-style-type: none"> • Module 10: Innovation in Design, Module 11: Summary, Module 12: Final Quiz • Video <ul style="list-style-type: none"> • Greenbuild 2008 session: “Sustainable Immersion: Community Change Through Sustainable Design Charrettes” • Readings <ul style="list-style-type: none"> • <i>Green Building and LEED Core Concepts Guide</i> (pages 65-75) • Innovation in Design credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • <i>GBCI’s LEED Green Associate Candidate Handbook</i> • <i>Cost of Green Revisited</i> from Davis Langdon • Activities <ul style="list-style-type: none"> • Unit 7: Think About It/Case Study • Unit 7: Where You Live • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 7: Self-Quiz • Help
<p>Unit 8: Materials and Resources— Concepts, Goals, and Strategies</p>	<ul style="list-style-type: none"> • Introduction • Learning Objectives • Unit Content • Readings <ul style="list-style-type: none"> • <i>LEED Green Associate Study Guide</i> (Note: Many of the practice questions from this guide are in the online Self Quizzes section.) • Materials and Resources credit category in the <i>LEED 2009 for New Construction and Major Renovations Rating System</i> • Activities <ul style="list-style-type: none"> • Unit 8: Make Flash Cards • Discussion <ul style="list-style-type: none"> • Post a response to the Discussion Question and/or respond to others’ ideas • Share responses to Think About It activity • Review <ul style="list-style-type: none"> • Unit 8: Self-Quiz • Help



LEED Central



LEED Central will be an online, one-stop, 24/7 environment for career readiness. This scalable solution includes exam preparations, foundational course preparations, and a resource center where educational materials can be reviewed, downloaded, and purchased.

Venues

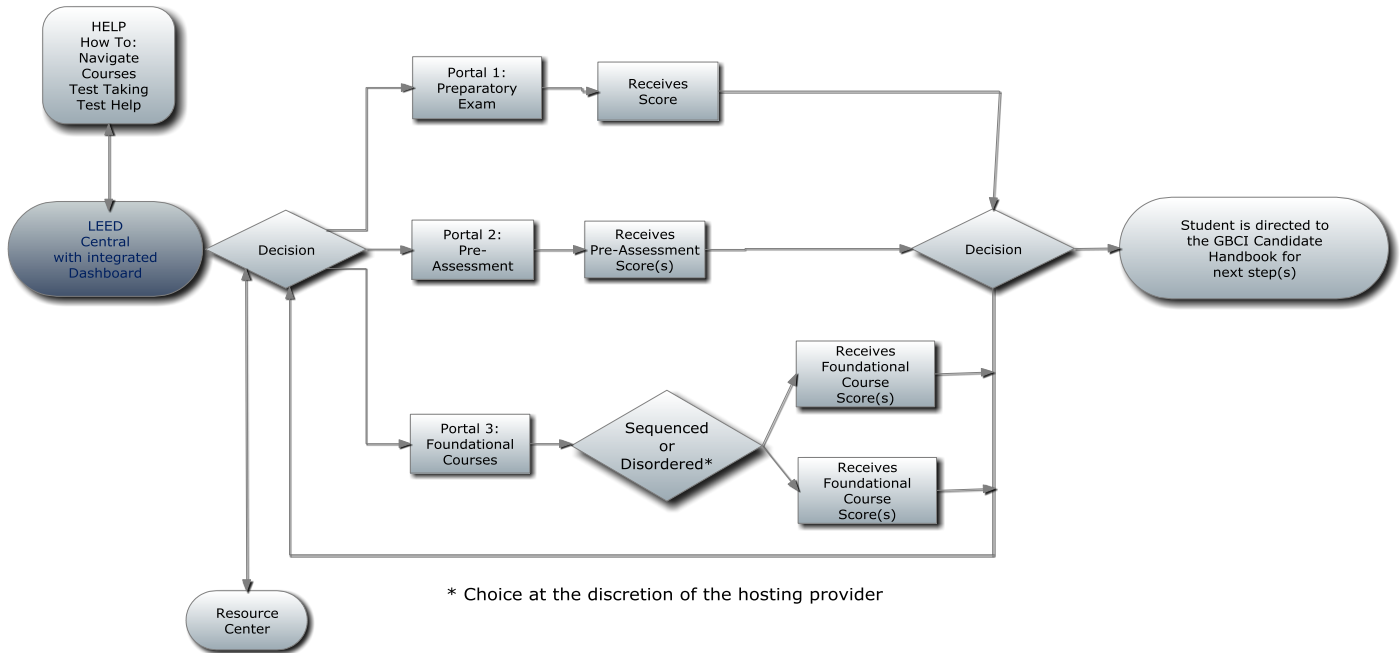
LEED Central will be designed to offer the United States Green Business Council dual-sourcing opportunities:

- **LEED Central Direct:** An in-house scalable exam platform that offers preparatory certification products directly to a consumer via an online portal.
- **LEED Central Scholar:** A scalable exam prep platform and content templates to serve as preparatory certification products for institutional/course adopters (primarily education).



LEED Central Schematic

LEED Central will offer on-line portals that will apprise them of their current knowledge level in a specific discipline or a general overall baseline review of their quest for a LEED Associate certification.





Help Portal:

Provides navigational aids, Help with Test Guide, Taking Test(s) Guide, etc.

Portal 1: Preparatory Exam

The LEED Green Associate Preparatory exam will be designed for those who feel that they currently have the skills and knowledge to pass the on-ground examination but want to verify this judgment.

The LEED Green Associate Preparatory exam will measure a learner's current skills and knowledge that support green design, construction, and operations. Assessments will be developed by subject-matter experts who have contributed to the assessments offered by the GBCI credentialing examination. These subject-matter experts will conform to all the conditions required by GBCI when developing our assessment questionnaire.

The LEED Green Associate Preparatory exam is comprised of 100 randomly delivered, multiple-choice questions. This exam will select, at random, 100 questions from a test bank of pooled questions equally selected from each of the six-question LEED Central categories. Modification of equally selected questions might occur should certain categories be deemed to be weighted. *See Table of Contents: LEED Central for more information.*

The total seat time for the LEED Green Associate Preparatory exam will be the same as the on-ground examination.

After completing the LEED Green Associate Preparatory exam, immediate test feedback will be provided to the learner. If the learner wants to take the on-ground exam, they will be directed to the proper venue for such activities. *For further information regarding the on-ground exam, visit <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2011>.*

Should the learner want to take the LEED Green Associate Pre-Assessment exam or review any of the foundational courses, he or she will be provided with an opportunity to do so. The LEED Green Associate Preparatory exam can be taken as often as the learner chooses.

Portal 2: Pre-Assessment Exam

The LEED Green Associate Pre-Assessment exam will be designed for those who want to ascertain the categories in which they might be proficient and the categories in which they might need additional academic work.

The LEED Green Associate Pre-Assessment exam will measure a learner's current skills and knowledge that support green design, construction, and operations.



Assessments will be developed by subject-matter experts who have contributed to the assessments offered by GBCI credentialing examination. These subject-matter

experts will conform to all the conditions required by GBCI when developing our assessment questionnaire.

This exam will select, at random, 100 questions from a test bank of pooled questions equally selected from each of the six-question LEED Central categories. Modification of equally selected questions this might occur should certain categories be deemed to be weighted.

The total seat time for the LEED Green Associate Pre-Assessment exam will be the same as the on-ground examination.

After completing the LEED Green Associate Pre-Assessment exam, immediate test feedback on the learner skill level for each category will be displayed. Should the learner want to take the on-ground exam at this time, he or she will be directed to the proper venue for such activities. *For further information regarding the on-ground exam, visit <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2011>.*









Should the learner want to take the LEED Green Associate Preparatory exam or review any of the foundational courses, he or she will be provided with an opportunity to do so. The LEED Green Associate Pre-Assessment exam can be taken as often as the learner chooses.



Portal 3: Foundational Courses

Portal 3 will provide students with access to foundational course materials that will enhance and engage the students. These foundational courses will be designed to be instructionally sound and to engage the student with interactive educational materials. Courses can be assigned and completed in sequence (course/institutional adoption) or allow users to choose from an open menu of offered courses. The choice will be at the discretion of the hosting provider.

These foundational courses are as follows:

	U.S. Green Business Council and it's Programs
	Sustainable Sites course
	Water Efficiency course
	Energy and Atmosphere course
	Materials and Resources course
	Indoor Environmental Quality course
	Innovation in Design course
	Regional Priority is currently under development. When this category is completed, it will represent a seventh category.



All course content will include the following components:

- Instructionally aligned content based on key topics tied to certification guidelines
- Text and multimedia (art, photos, video, animation, simple activities, and so on)
- Integrated self-check practice questions tied to module topic

Courses can be assigned and completed in sequence (course/institutional adoption) or allow users to choose from an open menu of offered courses.



U.S. Green Business Council and its Programs

The U.S. Green Business Council and its Programs cover Green Building, Priorities for LEED, LEED Rating Systems, Organization of LEED, Credit Categories, Point Distribution Across Credit Categories, LEED Certification Levels, Certification Process, Certification Tools, and Accreditation.



Sustainable Site Course

The Sustainable Site course covers transportation, site selection, site design and management, and stormwater management. This course will examine project content and interplay among its local and regional environments as well as the ecosystems and water resources within the project's conceptual boundaries.



Water Efficiency Course

The Water Efficiency course covers indoor water for restrooms, outdoor water for landscaping, and process water for industrial purposes and building systems. This course will examine efficient measures that reduce the amount of portable water used by buildings while still meeting the needs of the systems and occupants.



Energy and Atmosphere Course

The Energy and Atmosphere course covers energy demand, efficiency, performance, and renewable activities. This course will examine project content and interplay among its local and regional environments as well as the ecosystems and water resources within the project's conceptual boundaries.



Materials and Resources Course

The Materials and Resources course covers waste management and life-cycle impacts. This course will examine strategies that recognize and encourage use of materials and resources from a long-term, life-cycle perspective.



Indoor Environmental Quality Course

The Indoor Environmental Quality course covers indoor air quality, thermal comfort, lighting, and acoustics. This course will examine strategies that enhance the lives of the building occupants, increase the resale value of the building, and reduce liability for the building owners.



Innovation in Design Course

The Innovation in Design course covers exemplary strategies that surpass the requirements of existing LEED credits and substantially exceed the performance-based standards for energy, water, and waste management.



Regional Priority

Regional Priority is currently under development. When this category is completed it will represent a seventh category.



Portal 4: Resource Center

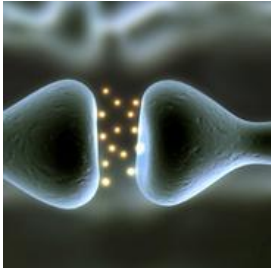
LEED Central's Resource Center will be designed to centralize all associated publications, web sites, and other educational materials associated with LEED Green Associate credentialing. All educational materials should be mapped to their correct foundational courses for ease of access. Access to internal lead contact form USGBC will be required in order to identify and validate materials

Amended 8/22/2011



Instructional Methodology- *amplifire*®

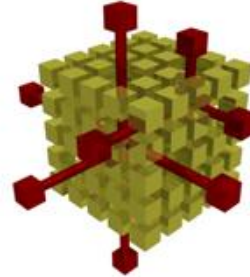
amplifire is a next-generation learning software based upon more than a century of science in the fields of Neurobiology, Cognitive Psychology, and Game Studies.



Neurobiology



Cognitive Psychology



Game Studies

amplifire combines this vast body of specialized research with a powerful technology platform to deliver the world's most effective, efficient learning solution. With over 20 million learner iterations, *amplifire* has consistently proven:

- **20% Misinformation**
 - Nearly 20% of knowledge contained in any well-trained organization is actually *misinformation* (meaning knowledge that employees strongly believe is correct, but is in fact incorrect)
- **95% Mastery**
 - Through adaptive remediation of *misinformation* and knowledge gaps, every learner has an opportunity to achieve mastery
- **80% Knowledge Retention After 6 Months**
 - vs. industry standards of 35% after 2 months
- **75% Reduction in Training Times**
 - Condensing a 2-day ILT course into only 4 hours of training time

After more than a decade of deeply delving into these three areas of science, *amplifire* incorporates 23 proprietary triggers that enhance learning and long-term memory formation. These 23 triggers comprise *amplifire's* patented *accelerated memory protocol*, and are embedded throughout the application to create adaptive, personalized learning and long-term retention.



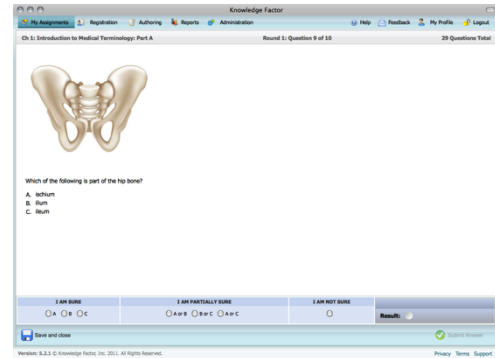
Instructional Process

1. Questions First

amplifire's rapid-learning environment begins by establishing a baseline of learner knowledge. It starts by asking questions first, regardless of whether or not learners have studied the material. This approach stimulates critical thinking, heightens engagement in the learning process, and prepares the brain to acquire and retain information. In fact, studies in the field of cognitive psychology show that retrieval-practice and test-enhanced learning methods – ***amplifire*** uses these same methods – outperform traditional study methods by 50% in terms of knowledge retention.

When learners enter *amplifire*, they are presented with 8-10 questions randomly pulled using a weighted algorithm from the full learning module test bank of 25-50 questions.

Each question is written in a three-answer, multiple-choice format, and supports robust multimedia capabilities, so any type of learning aids - pictures, videos, flash, external links, simple text, etc. - can be incorporated into the question.



2. Unique Answer Key

Cognitive psychology and neurobiology have highlighted the importance of “the feeling of knowing” and the role of confidence in memory formation. Researchers found that asking learners to indicate *how certain they are about their answer choices* engages both the intellectual and emotional areas of their brains concurrently. This dual engagement strategy is one of the key triggers of long-term memory formation.

This triggering mechanism evolved into *amplifire's* answer key. In each question, learners are asked to indicate simultaneously both their knowledge and their level of certainty – how sure, or confident, they are about their answer choice – by indicating, “I am sure,” “I am partially sure,” or to admit “I’m not sure.”





3. Immediate Feedback

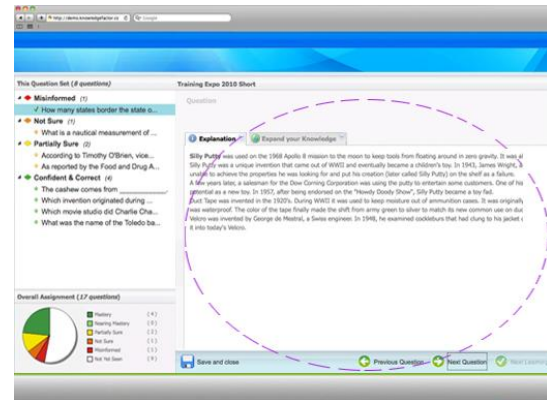
Within each question *amplifire* provides learners with real-time feedback on their answer choices without immediately disclosing the correct answer. This heightens curiosity and concentration and increases the formation of long-term memory.



4. Learning Center

After learners answer all the questions in a question set, learners are taken into the learning center, where *amplifire* analyzes their responses from the previous question set and provides detailed feedback on their answer choices.

amplifire delivers the learning associated with each question in an advanced flashcard-like format. The software takes the information that learners need to learn and breaks it into the individual concepts or ideas associated with each question. This approach, using chunking and feedback, is taken directly from cognitive psychology research regarding how the brain best stores information long-term.



For each question, learners see their answer, the correct answer and a full explanation of both the correct and incorrect answers. In this section there is also room to insert "Expand Your Knowledge" (EYK) material for more in-depth learning.

This approach heightens the capacity to absorb information and leads to an average of 80% knowledge retention after 6 months versus *35% after 60 days with traditional methodologies.

Learning Loop

Once learners review the learning for the first set of questions, *amplifire* presents them with a new set of questions. This adaptive iteration demonstrates *amplifire's* learning loop – a personalized learning approach that cycles learners through a process of test, learn and re-test until they achieve 100% mastery of the material.

amplifire's learning loop leverages advanced algorithms to optimize each iteration, resulting in highly targeted learning tailored to learners' individual needs.



The software delivers questions in a way that maximizes exposure to the information that needs the most remediation (Confident & Incorrect), and minimizes exposure to the information that needs the least (Confident & Correct), so that learners remain engaged throughout the entire learning process.

While it might seem that this repetitive process takes longer, it's actually a much more efficient and effective way to learn. In fact, total study times have generally decreased by 50-75%.

5. Reporting

amplifire's 8 standard reports can be analyzed on an individual, organizational and question-by-question level, and include the ability to monitor a variety of metrics such as:

- Learners' progression through a module, course and/or program
- Beginning levels of knowledge, end levels of knowledge and a detailed account of how learners progressed to 100% mastery
- The number of learning loops it took learners to reach mastery
- Time it took learners to reach mastery
- Organizational performance across modules, courses and entire learning programs
- Analysis of learning competencies including, mapping competencies to questions, learners, modules and overall educational goals

These reporting capabilities can tie metrics to business goals, measure learners' pre-determined skill sets, and even serve as a starting point for mentoring and coaching. Custom reports can also be created to suit specific client needs.



Delivery Methodology

Dashboards are really a simple representation of the specific, usually multi-dimensional, information needed to make better decisions, monitor specific progress, track trends, and provide a level of protection for the organization and learners with access to the real facts.

The challenge is that dashboard technology alone is meaningless without three fundamental pillars in place: data that is organized in a way that it is understandable to stakeholders, data that is dependable (clean), and a data architecture that allows for the introduction of data from multiple relevant sources required for meaningful analysis. Once those three elements are in place, some additional "nice-to-have" elements include fast access to the data without bogging down application resources as can happen in a typical traditional 3-layer learning system architectures, and the use of multiple kinds of databases including newer types that have less complicated tables formats, and provided real-time access to the right data in pre-compiled formats.

The United States Green Building Council should consider the next generation learning platform tools without the need to implement a separate reporting infrastructure and dashboard tools. For your needs like: having your users be able to see the courses that have reviewed and assessment results, provide preparatory exams results, pre-assessment exam results, and educational materials downloaded and purchased by a learner, all that functionality is available and can be viewed with optional dashboard display features. Additionally, in the case where USGBC wishes to provide their content to other educational institutions, the standard traditional learning system data can be easily integrated to include an interface with a student roster and/or a grade book to provide the data required either in a "flat" format, or in an optional multi-dimensional display.



Standards of Quality

The considerations of validity and reliability are typically viewed as essential elements for determining the quality of any test. However, professional and practitioner associations frequently place these concerns within broader contexts when developing standards and making overall judgments about the quality of any test as a whole within a given context. A consideration of concern in many applied research settings is whether or not the metric of a given psychological inventory is meaningful or arbitrary. *For more information on Psychometrics, see Appendix E: Psychometrics Links*

Testing Standards

In the field of testing standards, *The Standards for Educational and Psychological Testing* place standards about validity and reliability along with errors of measurement and related considerations under the general topic of test construction, evaluation, and documentation. The second major topic covers standards related to fairness in testing, including fairness in testing and test use, the rights and responsibilities of test takers, testing individuals of diverse linguistic backgrounds, and testing individuals with disabilities. The third and final major topic covers standards related to testing applications, including the responsibilities of test users, psychological testing and assessment, educational testing and assessment, testing in employment and credentialing, plus testing in program evaluation and public policy. An overview of organization and content is as follows:

Part I: Test Construction, Evaluation, and Documentation¹

1. Validity
2. Reliability and Errors of Measurement
3. Test Development and Revision
4. Scales, Norms, and Score Comparability
5. Test Administration, Scoring, and Reporting
6. Supporting Documentation for Tests

Part II: Fairness in Testing

7. Fairness in Testing and Test Use
8. The Rights and Responsibilities of Test Takers
9. Testing Individuals of Diverse Linguistic Backgrounds
10. Testing Individuals with Disabilities

Part III: Testing Applications

11. The Responsibilities of Test Users
12. Psychological Testing and Assessment
13. Educational Testing and Assessment
14. Testing in Employment and Credentialing
15. Testing in Program Evaluation and Public Policy

¹(American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. (n.d.).



Evaluation Standards

In the field of evaluation, and in particular educational evaluation, the Joint Committee on Standards for Educational Evaluation has published three sets of standards for evaluations². *The Personnel Evaluation Standards* was published in 1988; *The Program Evaluation Standards*, 2nd edition, was published in 1994; and *The Student Evaluation Standards* was published in 2003.

Each publication presents and elaborates a set of standards for use in a variety of educational settings. The standards provide guidelines for designing, implementing, assessing, and improving the identified form of evaluation. Each of the standards has been placed in one of four fundamental categories to promote educational evaluations that are proper, useful, feasible, and accurate. In these sets of standards, validity and reliability considerations are covered under the accuracy topic. For example, the student accuracy standards help ensure that student evaluations will provide sound, accurate, and credible information about student learning and performance.²

² (Joint Committee on Standards for Educational Evaluation, n.d.)



Testing Construct

A review of the educational materials indicated the scope of the current credentialing examination. This review included the composition and format of the current on-ground test and suggested proposed on-line solutions. Detailed examinations of these topics are as follows:

Exam Content Scope

The scope of the credentialing on-ground examination can be found by reviewing page 12 of the GBCI Candidate Handbook. Visit <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2011> for further information

Exams are comprised of both scored and unscored items. All items are delivered randomly throughout the exam; candidates are not informed of an item's status, so candidates should respond to all the items on the exam. Unscored items are placed in an exam to gather performance data that will inform whether the item should be scored on future exams.

Required Learning Domains and Levels for Credentialing Exams

All LEED Professional Credentialing exams will assess the candidates' abilities in three hierarchical cognitive levels: Recognition, Application, and Analysis. It is important that developed courseware and associated assessments demonstrate the breadth and depth of the candidates' knowledge as it pertains to the content provided. A general description of these levels is as follows:

- Recognition Items: The ability to recall facts in a similar context to the on-ground exam.
- Application Items: A problem or scenario that the student can solve by using principles or procedures.
- Analysis Items: The ability to break down components in order to solve a problem. The student must be able to not only recognize the problem but be able to evaluate the relationship or interactions of presented elements.

For additional information on Domains and Levels, see Appendix F.

Simulated Practice Exams

Exams are comprised of both scored and unscored items. All items are delivered randomly throughout the exam; candidates are not informed of an item's status, so candidates should respond to all the items on the exam. Unscored items are placed in an exam to gather performance data that will inform whether the item should be scored on future exams.

All test preparation exams will have the following components:

- Same rigor as on-ground exam
- Same number and types of questions as on actual exam
- Same time limit as actual exam
- Self-scoring with immediate feedback after completion of exam



- Addition: Foundational Courses assessments and check-your-understandings (CYUs) will link back to correct answer and associated category

Assessment Question Development

Subject-matter experts (SMEs) will be employed to write all the online test questions. They will use the same guidelines to write our questions as they are required to do for the actual examination.

A minimum test bank of 700 questions prepared by SMEs should be developed to ensure validity and reliability. Approximately 100 questions should be developed for each of the following topics: U.S. Green Business Council and its Programs, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation in Design (Regional Priority content is currently under development).

Preparatory and Pre-Assessment Exam Format

Sample questions for the Preparatory and Pre-Assessment portals will use the following format:

- 1. What Carpet and Rug Institute (CRI) program set standards for low-emitting carpets, adhesives, and pads?**
 - A. Green Seal
 - B. Green Guard
 - C. Green e Certified
 - D. Green Label Plus

Answer:*
D. Green Label Plus

This question aligns itself with:

 - I. Synergistic Opportunities and LEED Application Process*
 - D. Standards that support LEED credit*

- 2. Why should a green project be located in an existing community?**
 - A. Adequate parking is available on site.
 - B. The zoning approval for the project is easier.
 - C. Native plants can be used for erosion control.
 - D. The connection to basic community resources is present.

Answer:*
D. The connection to basic community resources is present.

This question aligns itself with:

 - II. Project Site Factors*
 - D. Standards that support LEED credit*
 - B. Community connectivity*
 - 2. Pedestrian access*



* Note: Answers for the Preparatory Exam portal and Pre-Assessment portal will not have mapped link alignment. The questions and answers developed for the foundational courses will have such a feature.

Preparatory Test Completion

After completing any or all aforementioned portals, the student will be directed to the *LEED Green Associate Handbook*. Visit <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2011> for further information.

Management and Reporting

- The direct to client model needs a “dashboard” that an individual user can reference to get feedback on their progress (modules reviewed, practice exam results, downloads student roster, grade books, etc.)
- Institutional/course adoption model needs to integrate with standard LMS functionality as well as the functions included in the direct to client model.



Appendix A: The ADDIE Model

The ADDIE model is a generic and simplified instructional systems design (ISD) model. ADDIE is short for Analyze, Design, Develop, Implement, and Evaluate. Although the origin of the ADDIE label is obscure, the underlying concepts of ISD can be attributed to the model developed for the armed forces of the United States in the mid-1970s.³

Phase	ADDIE Model ⁴
Analysis ▼	<ul style="list-style-type: none">• Analysis often includes conducting a needs assessment, identifying a performance problem, and stating a goal.
Design ▼	<ul style="list-style-type: none">• The Design phase includes writing objectives in measurable terms, classifying learning as to type, specifying learning activities, and specifying media.
Development ▼	<ul style="list-style-type: none">• The Development phase includes the development of student materials for both print and online activities.
Implementation ▼	<ul style="list-style-type: none">• The Implementation phase delivers the instruction in the setting for which it was designed.
Evaluation ▼	<ul style="list-style-type: none">• The Evaluation phase consists of two parts: formative and summative evaluations.

³ (Molenda, Michael (June, 2003).

⁴ (American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. (n.d.).



Appendix B: Instructional Alignment

Instructional Alignment literally means "arrangement or position in a straight line." When we talk about *instructional alignment*, what we generally mean is that what is being taught is what is being tested. To put it simply, the concepts in the assignments/assessments should always derive directly from the course content and focus directly on the learning objectives.

But to view alignment fully, we take it one step further. When we look at instructional alignment, we are considering whether the topics, objectives, readings, assignments, and assessments all line up. In any well-designed course, the objectives should be designed based on the desired outcomes of the course. In turn, the following should also be true:

- The Lesson Presentation and readings should reflect the focus of the objectives.
- The assignments should reflect the level of the objective and the content of the lecture and readings.
- The test items should reflect the focus of the objectives.

As we get started, let's differentiate between course and lesson objectives.

- **Course objectives**, sometimes referred to as "terminal objectives" or "course outcomes" are the highest-level objective in the course. A course objective describes the skill or competency a student should have after completing the course.
- **Lesson objectives**, sometimes referred to as "enabling objectives," are lower-level objectives that build to each particular course objective. A lesson objective describes a smaller, simpler task or skill; often several lesson objectives must be completed before a course objective is achieved.

Instructional alignment is critical. We insist on alignment for the following reasons:

- ✓ **It's the right thing to do.**
Having objectives designed at the appropriate learning levels and ensuring that all assignments, test items, and course content meets that learning level is the right way to develop courses.
- ✓ **It facilitates content sharing.**
If we find that we are building a course that mirrors objectives from other courses, we can integrate the relevant course content, quiz pools, and assignments easily to build a new course.
- ✓ **It promotes learning.**
Having well-structured content allows students to learn materials in a systematic and logical manner.

The following information was re-purposed from the current on-line LEED 201 Core Concepts and Strategies course. A more complete and formal examination of the current materials will follow upon acceptance on this Needs Analysis.



Appendix C: amplifire

Five (of 25) Switches that Impact Learning and Memory

The amplifire™ application was designed and built on scientific research that uncovered 25 mental switches that trigger learning and memory. These switches were derived from decades of experiments and observations in experimental psychology, neuroscience, and online games. Below is a detailed view of five of the 25 switches embedded in amplifire's patented learning methodology.

Adaptive Repetition

The amplifire algorithm propels students to iteratively loop through the information until mastery is achieved. One of the first discoveries in psychology (in the 1880s) was the fact that repetition improves memory. Only recently has science shown how. As Donald Hebb hypothesized in 1949, repetition activates the genetic machinery that forms long-term memory through a complex cascade of molecular processes called LTP (Long-term Potentiation) that synaptically connects neurons. LTP causes neurons that fire together to wire together. The molecular basis for LTP was demonstrated by Eric Kandel through experiments on the nervous system of the marine mollusk, *Aplysia*. Those experiments garnered Kandel a Nobel Prize.

References:

- *Memory: A Contribution to Experimental Psychology*—Hermann Ebbinghaus, 1885
- *The Organization of Behavior: A Neuropsychological Theory*—Donald O. Hebb, 1949
- *Rescuing Impairment of Long-term Potentiation in Fyn-deficient Mice by Introducing Fyn Transgene*—Eric Kandel, National Academy of Science, 1997
- *The Molecular Biology of Memory Storage: A Dialog Between Genes and Synapses*—Eric Kandel, BioScience Reports, 2004

Feedback

Dr. James Bruno, one of the inventors of amplifire, set about to create a learning protocol which uses a very tightly constructed feedback loop so that learners can confidently commit correct information to long-term memory. His insights have been born out in recent experiments using college students. Recent research by Dr. Harold Pashler and others demonstrated that subjects who receive rich forms of feedback after a test retain almost 500% more information than students who are presented with either "Correct or Incorrect" feedback or who received no feedback.

References:

- *Using Testing to Provide Feedback to Support Instruction: A Reexamination of the Role of Assessment in Educational Organizations*—James Bruno, 1992
- *Spacing Effects in Learning: A Temporal Ridgeline of Optimal Retention*—Pashler et al., Psychological Science, 2008
- *Theoretical Analysis and Practical Implications: Optimizing Distributed Practice*—Pashler et al., Experimental Psychology, 2009
- *Memory*—Baddeley, Eysenk, Anderson, 2009
- *The Seven Sins of Memory: How the Mind Forgets and Remembers*—Daniel Schacter, 2002



Retrieval—The Testing Effect

Retrieval is one of the components of working memory and the process of thinking. A memory is first encoded in the language of neurons as synaptic patterns, and it is later retrieved. It turns out that the act of retrieving a memory profoundly affects encoding, storage, and its own later retrieval—a virtuous cycle of learning that amplifire puts to good use. In recent experiments, researchers found a correlation between testing and memory that was nothing short of astonishing. Repeated testing is 60% more effective than repeated study when retention is measured after one week.

References:

- *Enhancing Learning and Retarding Forgetting: Choices and Consequences*—Pashler et al., *Psychonomic Bulletin*, 2007
- *Retrieval Practice Produces More Learning than Elaborative Studying with Concept Mapping*—Karpicke and Blunt, *Science*, 2011
- *The Pluses of Getting It Wrong: The Case for Difficult Tests*—Roediger, *Scientific American Mind*, 2010

Spacing

Long-term memory is greatly enhanced by distributing the learning sessions over time. The spacing effect explains why “cramming” information in one massed setting is about the worst of all possible ways to learn anything for the long-term. Studies by Pashler and other researchers show that an optimal space exists between study sessions, but that it greatly depends on the interval until the test. When restudy follows the initial study session too closely there is very little memory improvement. As the researchers have noted, an astonishing 300% gain in memory can be achieved if the proper study gap to test interval is used.

References:

- *Spacing Effects in Learning: A Temporal Ridgeline of Optimal Retention*—Pashler et al., *Psychological Science*, 2008

Certainty—The Feeling of Knowing

Only recently have psychologists begun to consider the “feeling of knowing”, a core emotion as important as love, sadness, anger, and fear. In every-day usage, feelings of knowing show up in phrases like: “I’m not sure,” “I’m totally positive,” and “I haven’t a clue.” In amplifire, feelings of knowing are expressed in terms of doubt, certainty, or ignorance—amplifire’s *shades of knowledge*. The brain generates feelings of knowing by accessing special circuits that can sense the strength of a memory and its likelihood of being correct. Researchers have concluded that parallel processing is occurring in the brain when we access knowledge. One circuit area, the parahippocampal region, works on retrieving actual memories, while another, the ventromedial prefrontal cortex (VMPFC) processes clues for familiarity—the correctness of the information. The VMPFC, in



other words, is generating a sense of certainty, doubt, or the instantaneous feeling that the information is simply not present. amplifire makes these feelings visible.

References:

- *Neural Correlates for Feeling-of-Knowing: An fMRI Parametric Analysis*—Kikyo et al., *Neuron*, 2002
- *Functional Magnetic Resonance Imaging of Semantic Memory Processes in the Frontal Lobes*—Gabrieli, et al., *Psychological Science*, 1996
- *Neural Correlates of Actual and Predicted Memory Formation*—Yun-Ching Kao, *Nature-Neuroscience*, 2005
- *On Being Certain: Believing You Are Right, Even When You're Not*—Robert Burton: 2008



Appendix D: Design Document – Sustainable Sites

Course Outcomes

- Describe the key concepts of Sustainable Sites
- Explain the LEED goals for Sustainable Sites
- Describe strategies to achieve Sustainable Site goals
- Recognize key measures of Sustainable Sites
- Identify LEED standards for critical sustainable Sites measures

Lesson Outcomes

Lesson 1: Introduction to Sustainable Sites

1. Examine Sustainable Sites intents and the Integrative Approach.
2. Explore Sustainable Site concepts.

Lesson 2: Location and Planning

1. Review location and planning goals.
2. Discover examples of location strategies, density and diversity.
3. Review Case studies for location and planning
4. Examine LEED Credits related to choosing a smart location.

Course and Individual Lesson Objectives

Ln	Lesson Title	Reading Assignment	Course Objectives	Lesson Objectives	Assign #	Assignment Title	Assignment Type	Grading Method	Time on Task (Hours)
# 1	Lesson 1: An Introduction to Sustainable Sites		1.1 Describe the key concepts of Sustainable Sites	1.1.1 Examine Sustainable Sites intents and the Integrative Approach.	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID
				1.1.2 Explore Sustainable Site concepts.	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID

CYU* -Can be Multiple-Choice, Fill-in-the-Blank, or Short Answer

Ln	Lesson Title	Reading Assignment	Course Objectives	Lesson Objectives	Assign #	Assignment Title	Assignment Type	Grading Method	Time on Task (Hours)
# 2	Lesson 2: Location and Planning		1.2 Explain the LEED goals for Sustainable Sites	2.1.1 Review location and planning goals.	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID
				2.1.2 Explore Sustainable Site concepts.	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID
				2.1.3 Review Case studies for location and planning	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID



Ln	Lesson Title	Reading Assignment	Course Objectives	Lesson Objectives	Assign #	Assignment Title	Assignment Type	Grading Method	Time on Task (Hours)
				2.1.4 Examine LEED Credits related to choosing a smart location.	TBD by SME/ID	TBD by SME/ID	CYU*	TBD by SME/ID	TBD by SME/ID



Appendix E: Psychometrics Links

Psychometrics is a branch of psychology that deals with the design, administration, and interpretation of quantitative tests for the measurement of psychological variables such as intelligence, aptitude, and personality traits. A list of psychometric organizations has been provided to extend a readers interest in this subject. They are as follows:

<http://www.apa.org/science/programs/testing/standards.aspx>

<http://www.thepsychometricscentre.com/page/36/the-society.htm>

<http://www.psychometrika.org>



Appendix F: Learning Domains

Descriptors of Levels of Learning	Illustrative Verbs
<p>1. Remembering. Recalling previously learned material. The skill may involve recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain.</p>	<p>Remembering: enumerate, define, describe, identify, label, list, match, name, outline, recall, recite, recollect, relate, reproduce, select, state</p>
<p>2. Understanding. The ability to grasp the meaning of material. This skill can be shown by translating material from one form to another (words or numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects).</p>	<p>Understanding: change, construct, convert, decode, defend, define, describe, distinguish, discriminate, estimate, explain, extend, generalize, give example, illustrate, infer, paraphrase, predict, restate, rewrite, solve, summarize</p>
<p>3. Applying. The ability to use learned material in new and concrete situations. This can include the application of such things as rules, methods, concepts, principles, laws, and theories.</p>	<p>Applying: apply, change, compute, demonstrate, develop, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, organize, predict, prepare, produce, relate, solve, transfer, use</p>
<p>4. Analyzing. The ability to break down material into its component parts so that its organizational structure can be understood. This skill can include the identification of the parts, analysis of the relationship between parts, and recognition of the organizational principles involved.</p>	<p>Analyzing: analyze, breakdown, classify, compare, contrast, determine, deduce, diagram, differentiate, distinguish, identify, illustrate, infer, outline, point out, relate, select, separate, subdivide</p>
<p>5. Evaluating. The ability to judge the value of material (statement, novel, poem, research report) for a given purpose. The judgments are to be based on definite criteria. These can be internal criteria (organization) or external criteria (relevance to the purpose) and the student can determine the criteria or be given them.</p>	<p>Evaluating: appraise, ascertain, choose, compare, conclude, contrast, criticize, decide, defend, describe, discriminate, explain, interpret, justify, relate, resolve, summarize, support, validate, write (a review)</p>
<p>5. Creating. The ability to put parts together to form a new whole. This can involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information).</p>	<p>Creating: categorize, combine, compile, compose, conceive, construct, create, design, devise, establish, explain, formulate, generate, invent, make manage, modify, organize, originate, plan, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, tell, write</p>



Descriptors of Major Categories in the Psychomotor Domain

Illustrative Verbs for Stating Objectives

1. Imitation. An early stage in learning a complex skill, overtly, after the individual has indicated a readiness to take a particular type of action. Imitation includes repeating an act that has been demonstrated or explained, and it includes trial and error until an appropriate response is achieved.

2. Manipulation. Individual continues to practice a particular skill or sequence until it becomes habitual; the action can be performed with some confidence and proficiency. The response is more complex than at the previous level, but the learner still isn't "sure of him/herself."

3. Precision. Skill has been attained. Proficiency is indicated by a quick, smooth, accurate performance, requiring a minimum of energy. The overt response is complex and performed without hesitation.

4. Articulation. Involves an even higher level of precision. The skills are so well developed that the individual can modify movement patterns to fit special requirements or to meet a problem situation.

5. Naturalization. Response is automatic. The individual begins to experiment, creating new motor acts or ways of manipulating materials out of the understanding, abilities, and skills developed. The individual acts "without thinking."

Imitation: begin, assemble, attempt, carry out, copy, calibrate, construct, dissect, duplicate, follow, mimic, move, practice, proceed, repeat, reproduce, respond, organize, sketch, start, try, volunteer

Manipulation (same as imitation): acquire, assemble, complete, conduct, do, execute, improve, maintain, make, manipulate, operate, pace, perform, produce, progress, use

Precision (same as imitation and manipulation): achieve, accomplish, advance, automatize, exceed, excel, master, reach, refine, succeed, surpass, transcend

Articulation: adapt, alter, change, excel, rearrange, reorganize, revise, surpass, transcend

Naturalization: arrange, combine, compose, construct, create, design, refine, originate, transcend



Descriptors of the Major Categories in the Affective Domain	Illustrative Verbs
<p>1. Receiving. Willingness to receive or to attend to particular phenomena or stimuli (classroom activities, textbook, assignment, and so on). Receiving has been divided into three subcategories: awareness, willingness to receive, and controlled or selected attention. From the teaching standpoint, receiving is concerned with getting, holding, and directing the student's attention.</p>	<p>1. Receiving: acknowledge, ask, attend, be aware, choose, describe, follow, give, hold, identify, listen, locate, name, receive, reply, select, show alertness, tolerate, use, view, watch</p>
<p>2. Responding. Refers to active participation on the part of the student. The student is sufficiently motivated to attend, but is actively attending. Responding indicates the desire that a student has to become sufficiently involved in or committed to a subject, or activity so as to seek it out and gain satisfaction from working with it or engaging in it.</p>	<p>2. Responding: agree (to), answer, ask, assist, communicate, comply, consent, conform, contribute, cooperate, discuss, follow-up, greet, help, indicate, inquire, label, obey, participate, pursue, question, react, read, reply, report, request, respond, seek, select, visit, volunteer, write</p>
<p>3. Valuing. The student sees worth or value in the subject, activity, or assignment. An important element of behavior characterized by valuing is that it is motivated not by the desire to comply or obey but by the individual's commitment to the underlying value guiding the behavior. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable</p>	<p>3. Valuing: accept, adopt, approve, complete, choose, commit, describe, desire, differentiate, display, endorse, exhibit, explain, express, form, initiate, invite, join, justify, prefer, propose, read, report, sanction, select, share, study, work</p>
<p>4. Organization. Bringing together a complex of values, possible disparate values, resolving conflicts between them, and beginning to build an internally consistent value system. The individual sees how the value relates to those already held or to new ones that are coming to be held. The integration of values is less than harmonious; it is a kind of dynamic equilibrium that depends on salient events at a specific point in time.</p>	<p>4. Organization: adapt, adhere, alter, arrange, categorize, classify, combine, compare, complete, defend, explain, establish, formulate, generalize, group, identify, integrate, modify, order, organize, prepare, rank, rate, relate, synthesize, systemize</p>
<p>5. Characterization by a Value or Value Complex. Internalization of values have a place in the individual's value hierarchy. The values have controlled one's behavior for a sufficiently long period of time to have developed a characteristic "life style." The behavior is pervasive, consistent, and predictable.</p>	<p>5. Characterization: act, advocate, behave, characterize, conform, continue, defend, devote, disclose, discriminate, display, encourage, endure, exemplify, function, incorporate, influence, justify, listen, maintain, modify, pattern, practice, preserve, perform, question, revise, retain, support, uphold, use</p>



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