Lesson Author: Brian Bluhm  
Lesson Topic: LEED Buildings (LSBE and Civil Engineering)  
Grade level: College-aged students  
Length of lesson: 50 minutes

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<th>Stage 1 – Desired Results</th>
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<tr>
<td><strong>Content Standard(s):</strong></td>
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<td>- Campus Learning Goals: Knowledge (acquisition, integration and construction); Thinking (critical thinking and systems thinking); and Social Responsibility (global perspective and civic engagement) (<a href="http://www.d.umn.edu/vcaa/assessment/documents/InstGoals_Outcomes.pdf">http://www.d.umn.edu/vcaa/assessment/documents/InstGoals_Outcomes.pdf</a>)</td>
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<td>- UMD Strategic Plan Goal 6 (Enhance UMD’s infrastructure; technologies; and information, and human resources to support the campus in a sustainable manner), specifically Action Step 9 (Infuse the concept and application of sustainability into our curriculum and co-curriculum, our research activities, and our use of facilities) (<a href="http://www.d.umn.edu/chancellor/planning/action.html">http://www.d.umn.edu/chancellor/planning/action.html</a>)</td>
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<tr>
<th><strong>Enduring Understandings</strong> (Big ideas communicated succinctly)</th>
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<tr>
<td>Gain an understanding of sustainability efforts at UMD through the lens of LEED certified buildings.</td>
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<td>Become aware of the interconnections and interaction between the economy, the society and the environment.</td>
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<td>Grasp why sustainability is important in peoples’ lives.</td>
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<th><strong>Essential Questions</strong> (Lead with ECS)</th>
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<tr>
<td>A. Why is UMD investing in LEED certified buildings?</td>
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<td>B. How do LEED buildings impact your experience (learning experience; tuition) at UMD?</td>
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<td>C. How does the concept of sustainability relate to the concepts you’ve been discussing in your class and to our buildings?</td>
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<td>D. How will sustainability play a role in your life (career and personal life)?</td>
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<th><strong>Student objectives/learning outcomes</strong> (Scaffold these in increasingly complex order based upon Bloom hyperlink here)</th>
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<td>Students will:</td>
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<tr>
<td>I. Identify sustainable features of LSBE and Civil Engineering.</td>
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<td>II. Develop an understanding of the LEED certification system.</td>
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<td>III. Connect LEED certified buildings with sustainability initiatives on campus, and how sustainability impacts their coursework and future careers/lives.</td>
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## Stage 2 – Assessment Evidence

### Performance Tasks
*Real life assessments of this learning in the students’ worlds*

- Students will identify sustainable features in LSBE and Civil Engineering.
- Students will connect the sustainable features they identify with the LEED certification system through discussion.
- Students will discuss how understanding the LEED certified buildings on campus can connect to their coursework through discussion.

### Other Evidence
*Supportive details*

- Students participate in the conversation.
- Students take notes.
- Students ask thoughtful questions.

## Stage 3 – Learning Plan

### Learning Activities
*Education Neuroscientific Learning Cycle: Sense luscious, Reflective, Analytical, Motor, and so on*

1. **Materials & resources:** Play-Doh, Labovitz School of Business and Economics information (http://www.d.umn.edu/sustain/green_buildings/ee_lsbe.html), Swenson Civil Engineering Use Guide (http://www.d.umn.edu/sustain/green_buildings/Sciv_userguide.pdf), note cards for the number of students in the class and extras, pens for the number of students in the class and extras

2. **Timeline:**
   - Introduction and Sustainability example: 10 minutes
   - LEED Discussion and LSBE Exploration: 15 minutes
   - Walk to Civil Engineering: 5 minutes
   - Tour of Civil Engineering: 10 minutes
   - Final Discussion: 10 minutes

1. **Introductory activities:** Meet students in the LSBE lobby. Ask students to form a half-circle (this building has an echo). Distribute note cards and pens. Ask the students how many have had a class in LSBE. Ask students to share their experience in a LSBE classroom compared to a classroom in an older building on campus. Describe that we will be learning about the sustainable building design and the LEED certification system by touring LSBE and Swenson Civil Engineering. Tell students sustainability is part of the UMD Strategic Plan. Ask students to reflect on the essential questions.

2. **Developmental activities:**
- Tell students to take their note cards and pens along for the tour, and to write down additional thoughts and questions during the tour.
- Ask students for a definition of sustainability. Remind them to use their note cards to record their thoughts.
- Ask for students to pass around the Play-Doh, taking as much as they would like. See how far the Play-Doh gets around the half-circle. Collect the Play-Doh. Next, ask students to think of the Play-Doh as a resource (water for example), and let the students know that all the other students also need that resource. Ask the students to pass the Play-Doh around again with this new information in mind. Discuss what happens.
- Describe UMD’s commitment to sustainability, as it relates to buildings and grounds.
- Describe the LEED certification system (Leadership in Energy and Environmental Design). Describe the point system (sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality, as well as benefits and drawbacks of LEED).
- Ask students to take 5 minutes to explore the LEED features of LSBE, indicated by the UMD Sustainability signs.
- Once back together as a group, ask students to report back what they found, and connect to the LEED categories.
- Describe any features the students may have missed (see the LSBE webpage).
- Guide students to Civil Engineering.
- Give students a brief introduction to Civil Engineering, highlighting the lessons learned from LSBE (see Civil Engineering User Guide). Also, note how the build has been designed as a learning tool.

3. Closing activities:
- Bring the group back together in a half-circle.
- Ask the students to look at their note cards and review the essential questions.
- Ask the group to reflect on the LEED certification system and sustainability at UMD (1. Why would UMD build LEED certified buildings? 2. How do buildings relate to sustainability? 3. How do LEED buildings and sustainability initiatives on campus relate to your field of study and your future?)
- Ask the instructor/professor to connect the tour with the course, and what they will be discussing next.
- Let students know that if they are interested in learning more about sustainability initiatives at UMD, to check out the UMD Office of Sustainability website and Facebook page.
Connection to Educational Psychology

Stage 1

Enduring Understandings
- These big ideas guide the lesson, without being too specific (Medina, 2008).

Essential Questions
- The essential questions help to focus the learning objectives. These questions are formed in a way that encourages student involvement in learning, while giving the instructor a base from which to create emotionally competent stimuli. ECS serves as a bridge between emotion, which is key to learning, and cognitive processes (Shiv, 2011). ECS will assist the learner to move the experience from short-term memory to long-term memory, encoding the memories with dopamine and moving them from the hippocampus to the pre-frontal cortex (Medina, 2008). In this lesson, students are asked to reflect on LEED certified buildings at UMD, how LEED certified buildings fit into UMD's commitment to sustainability, and how sustainability will relate the students' lives in the future.

Stage 2

Assessment Evidence
- Assessment of learning should be done through identifying learning in multiple ways (multiple intelligences and emotional intelligence) and evidence tools (written, demonstrated) (Gardner, 2004; Goleman, 2006). The assessment evidence should be designed to be culturally inclusive, so that different learners' experiences and learning styles are identified and validated. For example, learners' can be assessed based on their written thoughts, discussion and/or through another creative method (Doidge, 2007).

Stage 3

Sense Luscious:
1. A short introduction will allow the students to become comfortable with their surroundings by reducing stress and meeting physiological and safety needs (Zull, 2002; Immordino-Yang & Faeth, 2010; Maslow, 1943). Reducing stress also helps the thought process move from the amygdala to the frontal cortex, where learning takes place (Medina, 2008; Willis, 2010).
2. Students will be able to use multiple intelligences in the way they perceive and experience the LEED buildings, including spatial and bodily-kinesthetic (Gardner, 2004). By moving their bodies, students will be making BDNF, which will encourage oxygen follow to the brain and increased neural development (Medina, 2011). Also, walking through the LEED buildings will be a sense luscious experience for the students. The experience will create emotional competent stimuli (ECS). Students will make new connections with emotions, memories and interests. New memories will be encoded with dopamine, which will make the memories more easily accessible to the students later (Medina, 2008).
Reflective:
1. Through sharing with others, students will be using multiple intelligences and emotional intelligences (intra and interpersonal) (Gardner, 2004; Goleman, 2006). Students will have the opportunity to relate the material to their own lives and interests ("...useful and relevant intuitions that guide their thinking and decision-making") (Immordino-Yang & Faeth, 2010).
2. Once again, students will be using multiple intelligences, enhancing memory through emotion and building upon previous experience (Gardner, 2004; Goleman, 2006; Immordino-Yang & Faeth, 2010). Students also will be using peer instruction, keeping them engaged in the material, and reinforcing the concepts (Mazur, 2011).

Analytical:
1. The lecture will expose students to the big ideas, leaving them with the responsibility to discover the specifics and contextualize the information (Medina, 2008). Visuals will help students to access multiple intelligences (Gardner, 2004; Zull, 2002). Also, the short time period of the tour will help to keep students' attention (Medina, 2008).
2. Students will be able to contextualize their understanding of the big ideas, through applying them to their own lives, memories and emotions (Immordino-Yang & Faeth, 2010; Medina, 2008). Once again, this will be a practice with emotional intelligence as well, as students discuss and share (Gardner, 2004; Goleman, 2006). Students will be using peer instruction again as well (Mazur, 2011), through sharing their thoughts and posing questions.

Motor:
1. The tour of the LEED certified buildings will provide the students with a concrete and sense luscious/visually-focused experience (Zull, 2002). Students will perceive the LEED buildings with area with multiple intelligences: spatial, kinesthetic and interpersonal intelligences (Gardner, 2004). Discussing experiences in the classroom will also provide the students with a context and an emotional connection to the subject (Immordino-Yang & Faeth, 2010). The experience will create ECS, encoding the memory with dopamine (Medina, 2008). The students will be moving their bodies as they explore LSBE and as they move from building to building, creating BDNF, which promotes cognitive function (Medina, 2011).
Additional Resources


