Integrating Sustainability in Construction Technology I and Metropolitan Nature

When working with Professor Franca Trubiano to integrate sustainability into Construction Technology I, we focused on 3 specific topics:

1. Material sustainability
   - Specifically concrete, glass, and polymers
2. ATHENA Sustainable Materials Institute
   - Using the EcoCalculator and Impact Estimator
   - Evaluating Life Cycle Assessments
3. Autodesk's Green Building Studio
   - In conjunction with Revit

**Arrayy Sustainable Materials Institute:**
-An organization that develops LCA (Life Cycle Assessment) data and software tools specifically related to construction.

**Life Cycle Assessment (LCA):**
-A "multi-step procedure for calculating the lifetime environmental impact of a product or service." (www.athenasmi.org)

**Green Building Studio:**
-A "web-based service that includes industry leading building energy and carbon analytics tools." (Using Green Building Studio with Revit in Autodesk and IFC data)
-Green Building Studio tools allow architects and designers to carbon footprint of various building designs and energy profiles.

Concrete
- Energy
- Production of Materials
- Thermal Mass
- Concrete and Aggregates
- Steel Reinforcing
- Water
- Transportation

Glass
- Energy
- Molten Mass
- Thermal Gain/Loss
- Transportation
- Raw Materials

Plastics & Polymers
- Non-renewable Origins
- Reusing and Recycling
- Energy

During the month of July, I assisted Professor Michael Nairn in teaching the Social Justice Academy for international high school students. They were encouraged to discuss and think about resilience thinking, a dynamic ecological theory based on systems theory that acknowledges that we are all part of a linked systems of humans and nature.

**Sustainable development is development that "meets the needs of the present generation without compromising the ability of future generations to meet their own needs."

- Brundtland Commission, formally, the World Commission on Environment and Development, 1987

"Sustainability is the management of socio-ecological systems to preserve both the quantity and quality of natural capital and our ecosystem services so both can perform their essential tasks of supporting life."

- Michael Nairn

Three Central Themes:
- Socio-ecological Systems
  - We all live and operate in social systems inextricably linked with the ecological systems in which they are embedded.
- Thresholds
  - Socio-ecological systems can exist in one or more stable states called regimes in which their function, structure, and feedback are different.
  - If a system changes too much, it crosses a threshold and begins to behave in a different way
- Adaptive Cycles
  - How socio-ecological systems change over time

"Resilience thinking is the notion that we are living in an interconnected system where the outcome of any action depends on the system’s past and present conditions as well as the actions themselves."

- Michael Nairn