

Overview

Developers are becoming increasingly interested in designing structures that are properly suited for their environments. Structures that are not designed this way are prone to damage from catastrophic environmental events such as flooding. According to the *Alberta Provincial Flood Damage Assessment Study* (<http://www.alberta.ca/albertacode/images/pfdas-alberta-main.pdf>), damage from flooding in Alberta has cost billions of dollars over the last decade. Without proper mitigation, cities must repeatedly repair and rebuild structures in flood areas at great expense.

In addition to flood mitigation, structures are being increasingly designed to reduce their impact on the surrounding environment. People are recognizing the importance of maintaining ecosystems in urbanized areas by considering factors such as erosion, airflow, solar exposure, and pollution (i.e. chemical, light, and sound). One way of regulating building design is through certification programs such as LEED (<http://www.usgbc.org/leed>).

LEED certified buildings save money and resources overtime and are designed to have a positive impact on the health of occupants, while promoting renewable, clean energy. LEED standards influence the building design and construction, interior design, building operation and maintenance, and neighbourhood development. To obtain LEED certification, credits are given to building designs that provide:

- Access to a variety of transportation options
- Are energy efficient
- Are water efficient and reduce potable water consumption
- Create innovative solutions to problems
- Have high quality indoor air and access to daylight/views
- Minimize the impact on ecosystem and water resources
- Use sustainable building materials and reduce waste

Design Rationale

Land is in short supply and decisions made for land use must be a rigorous process involving market analysis, demographic research, education, multiple stakeholder points of view, scientific input and considerations of sustainability. Before a solution is chosen, all viewpoints, demographic and economic points of view should be considered and should be allowed to offer questions and multiple solutions/options. Solutions should adhere to a three-prong approach using the pillars of sustainability—economic, environmental, and societal needs (Retrieved January 2016, <http://www.thwink.org/sustain/glossary/ThreePillarsOfSustainability.htm>). These pillars help guide problem finding and help planners work toward solutions that will be successful and sustainable into the future.

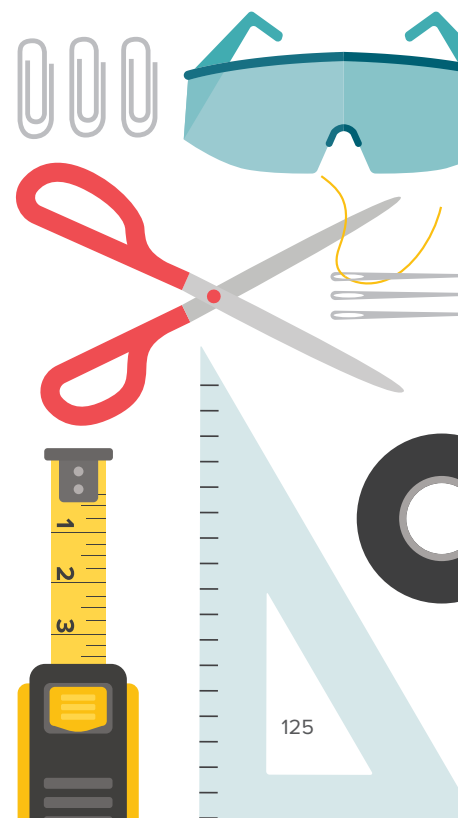


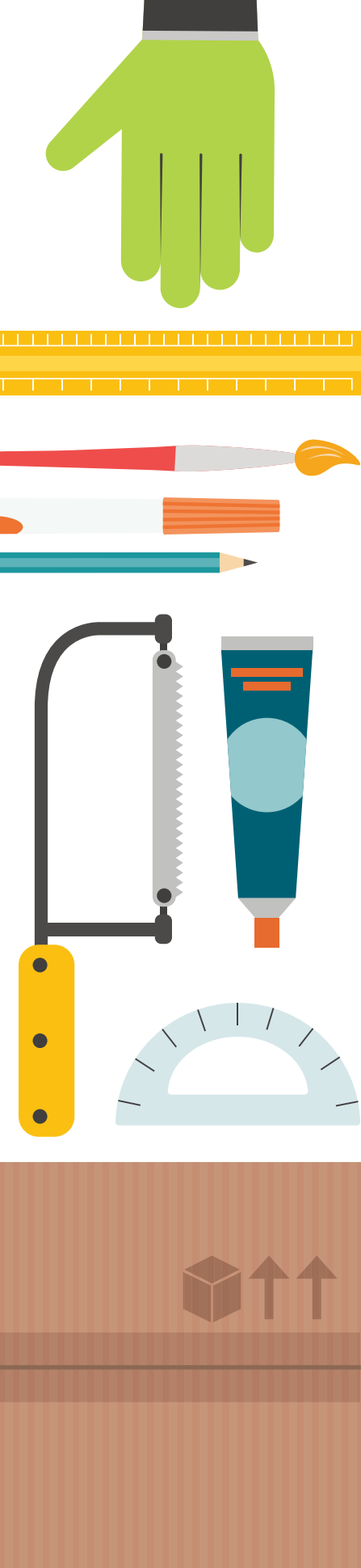
Suggested Grade Level

- Upper elementary through to secondary school
- Possibly primary grades with adult assistance

Suggested Subject Area

- Citizenship—including school culture/community
- ADST
- Physical Education
- Science
- Social Studies





Problem Scenario

Your team has been selected to design and develop a proposal for a recreational facility on a plot of land. Your design must preserve the ecosystem, while minimizing environmental impact and providing opportunities for all interested stakeholders. You have an undeveloped plot of land with a creek running through it. The total area is 30 acres, and you do not have to develop it all. This is an imaginary plot of land in your community, so other than the creek and the size, you can use your imaginations to describe the property you are developing.

Your proposal must meet the following criteria:

- Development addresses the protection of the area from flood damage
- Environmental preservation is considered in the development
- Offer multiple recreation opportunities
- Provide evidence of research into the site characteristics, including size, topography, soil composition, vegetation, surrounding features, existing infrastructure
- Provide models of any structures to be built, and they must be constructed to be environmentally friendly (see LEED certification requirements as a reference)
- Year round access is provided to recreational opportunities

You will create a design document as well as a prototype or scale model that demonstrates your design. A design document is a series of sketches and written descriptions that answer the criteria presented in the problem scenario. A prototype or a model illustrates the functionality of an idea or design.

Success Determinants

Success will be determined by:

- ☐ Addresses Pillars of Sustainability
- ☐ Alignment of the design to meet the needs outlined in the problem scenario
- ☐ Alignment of the prototype and the design sketch
- ☐ Alignment to the motto: “Make it smaller, stronger, do more, be easier to use (build), be cheaper, be clean, be greener.”
- ☐ Design incorporates concepts from the course content
- ☐ Uniqueness of design and prototype

Parameters

- ☐ You may make a pitch to use the materials found in the pantry.
- ☐ You must complete a display panel, which includes your design thinking sketch, your prototype, your design notes, and your reflections on the activity.
- ☐ You must use some of all the items in participant group kit in some way.
- ☐ You should use the tools provided by the teacher.