Engineering A Green Roof

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Introduction

• This session will introduce teachers to “Green Roofs” ([http://teachers.egfi-k12.org/lesson-green-roof-design/] )

• Two complete lesson plans are available on the eGFI” web site. Lesson plans are intended for students in middle and high school grades but the basic concepts can be introduced earlier and field trips can be a good start.

• Teachers will take away a general knowledge of green roofs and ideas for introducing to their students.
Plan for Today

• Discuss some general aspects of green roofs
• Review eGFI plan for green roofs and how it may be adapted for elementary students
  – For example a field trip
• Discuss Convention Center roof
• “Visit” Convention Center roof
Lesson: Design a Green Rooftop Garden

Posted on May 1st, 2011 by mjd

Toronto City Hall Green Roof


(Lesson from TeachEngineering.org, courtesy of the Integrated Teaching and Learning Program, College of Engineering, University of Colorado at

http://teachers.egfi-k12.org/design-a-green-rooftop-garden/)
Lesson: Green Roof Design

Posted on November 2nd, 2009 by ASEE

(Lesson courtesy of Science NetLinks) Level: Grades 9-12.

Summary

In this lesson for grades 9-12, students work in teams to design a heat- and water-conserving "green roof" of plant material for an urban apartment building. They address economic and community considerations of green roof design.

http://teachers.egfi-k12.org/lesson-green-roof-design/
Activity: Green Roof Field Trip

Posted on June 21st, 2011 by sah | Edit

(Activity adapted from the rain garden curriculum created by the University of Wisconsin, Madison, Arboretum’s Earth Partnership for Schools)

Grade level: Elementary (K – 6)

Group size: 12 – 35

Time needed: 1 to 3 hours

Cost per group: Transportation

Summary: What is a green roof? How do rooftop gardens help protect the environment? In this field-observation activity, elementary students individually or working in teams will learn about green-roof design, energy conservation, and the types of plants and creatures that can live successfully in rooftop gardens.

Adapted from the rain garden curriculum created by the University of Wisconsin, Madison, Arboretum’s Earth Partnership for Schools)
Green Roof Field Trip

- New lesson plan
- Develop observational skills important in many design and science fields.
- Collecting and recording data – observational data
- Developing and refining design concepts
Living Roof

- Six acre (2.4 hectare) downtown rooftop eco-system featuring more than 20 species from the west coast
- Largest green roof in Canada; largest non industrial living roof in North America
- 400,000 indigenous plants and grasses (350,000 plants, 40,000 bulbs, 10 species of native grass and herb seeds). Unique plants include Beach Strawberries, Hookers Onion, Native Sedges, Native Potentilla and Aster
- Home to four beehives with European honey bees (*apis mellifera*)
- Over 5,000 cubic metres of growing medium weighing over 11 million pounds - consisting of lava rock, topsoil and Gravel (approximately six inches deep). The topsoil consists of dredged silt from the Fraser River
- Building’s black water treatment process also collects, cleans water from washrooms for use in living roof irrigation system during summer
- No chemical fertilizers, pesticides or herbicides will be used. Each year, the roof will be “mowed” in the fall, and clippings will be composted back into the soil as fertilizer.
Plants

Plugs

- Chamiso Sedge (*Carex pachystachya*)
- Pacific Meadow Sedge (*Carex pansa*)
- Berkeley Sedge (*Carex tumulicola*)
- Beach Strawberry (*Fragaria chiloensis*)
- 'Pacifica' Silverweed (*Potentilla anserine*)
- Broad Leafed Stonecrop (*Sedum spathulifolium*)

Seed

- Bent Grass (*Agrostis pallens*)
- Pearly Everlast (*Anaphalis margaritacea*)
- California Poppy (*Eschscholzia maritime*)
- Idaho Fescue (*Festuca idahoensis*)
- 'Quatro' Quatro Sheeps Fescue (*Festuca ovina vulgaris*)
- Creeping Red Fescue (*Festuca rubra*)
- June Grass (*Koeleria macranthe*)
- California Blue-eyed Grass (*Sisyrinchium bellum*)
Plants cont’d

Bulbs
- Hooker’s Onion (*Allium acuminatum*)
- Nodding Onion (*Allium cernuum*)
- Harvest Brodiaea (*Brodiaea coronaria*)
- Fools Onion (*Brodiaea hyancinthina*)
- Common Camas (*Camassia quamash*)
Field Trip

• Record what you see
  – Field trip sheets
    • Topography
    • Plants
    • Water
    • Design your own

• Careful study of your past projects an important part of improving design
Wrap Up

• See eGFI site for actual lesson plans
• Green roofs can be done at any grade level
• Field trip is easy way to get started; you can probably get a professional to join you probably even arrange the trip!
• Many approaches. All are part of storm water management strategy in many communities
Resources

• https://sites.google.com/site/k12greenroofs/home