



## Create a Rain Garden or Bioswale

Based on notes from Dana Nunez Brown, ASLA, AICP, ALSA Louisiana, and colleagues' 2008 Chapter activity

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### Summary

This activity provides step-by-step procedures for a 50-minute classroom session that introduces landscape architecture, sustainability, and the environmental benefits of rain gardens and bioswales.

If you plan to design and build a rain garden or bioswale, the activity provides suggestions for how to involve students.

### Learning Objectives

Students will:

- Learn about landscape architecture as a career
- Understand the benefits of sustainable landscape practices
- Understand the environmental benefits that rain gardens and bioswales provide

### Publicize and Document Your Activity

By taking the time to create and implement a WLAM Career Discovery activity, you achieve two great results—you promote the profession while teaching students about sustainability, ecological issues, and the technical aspects of landscape architecture.

Be sure to publicize your activity within your community and document it to share your experience with other ASLA chapters. Refer to the appendix for suggestions on publicizing and documenting your activity.

### Grade Level: 6–12

### Duration

1 to 4 class sessions (about 50 minutes each) over a one-month period.

Construction requires additional time. Allow a one-month lead-time for permission and planning.

### Personnel

- Teacher or other adult sponsor
- Landscape architect(s)

### Costs

- Printing (handouts and brochure)
- Landscape architect volunteer time

If you plan to build out a rain garden or bioswale, costs will vary.

- Estimated cost for a rain garden is \$3–5 per square foot if labor is donated
- Estimate \$200–4,000 for a 200m<sup>2</sup> bioswale.

Check with your county Soil and Water Conservation District and the EPA to see if they are offering grants.

If students will be documenting the impact of the project, factor in these costs:

- An infiltrometer to measure water flow and volume costs about \$300-400
- A water testing kit is about \$100



## Materials

### PROFESSIONAL MATERIALS

- Images of landscape architecture projects that utilize sustainable landscape practices
- Project materials your firm has produced; example models your firm has built/created
- Copies of ASLA's *Your Path to Landscape Architecture* brochure (obtained by contacting ASLA public relations and communications coordinator JR Taylor at 202-216-2345 or jtaylor@asla.org).

### EQUIPMENT FOR CLASS SESSIONS

- Writing surface (board, flip chart, etc.)
- Markers to use on the writing surface

### SESSION HANDOUTS (SEE APPENDIX)

- *Landscape Architecture FAQs*

### EQUIPMENT FOR BUILD OUT

- Shovels
- Tractors
- Soil, sand, clay
- Building materials and construction (if built)
- Organic compost
- Tools (tractor, rakes, shovels, gloves, etc.)
- Vegetation (seeds, plants, trees)
- Gravel, rocks (large and small)

## Preparation Checklist

At least one month in advance:

- Contact a school, Scout troop, or other organization that might be interested in this activity.
- Select a team of landscape architects.

One week prior:

- Touch base with the teacher or adult sponsor to reconfirm dates and times.
- Gather images of landscape architecture projects utilizing sustainable landscape practices. Ideally, these will be your local projects and include rain gardens and/or bioswales.
- Make copies of materials you plan to distribute during your presentation.



## Procedure

### Overview of Landscape Architecture and Rain Gardens/Bioswales

#### ADVANCE PREPARATION

- Select images of local landscape architecture projects utilizing sustainable practices.
- Be sure there's a surface on which to write (chalk board, white board, or flip chart).

#### WHAT TO DO

##### SET THE STAGE

TIME: 5 MIN

1. Introduce yourself. Write your name where students can refer to it.
2. Tell the students you are a landscape architect and today they will learn a little about landscape architecture as a career and explore how landscape architects use sustainable landscape practices.
3. Ask students what they think landscape architects do.
  - Explain that landscape architecture encompasses the analysis, planning, design, management, and stewardship of natural and built environments.
4. Ask students for examples of the types of projects they think a landscape architect might design.
  - Types of projects include: residential; parks and recreation; monuments; urban design; streetscapes and public spaces; transportation corridors and facilities; gardens and arboreta; security design; hospitality and resorts; institutional; academic campuses; therapeutic gardens; historic preservation and restoration; reclamation; conservation; corporate and commercial; landscape art and earth sculpture; interior landscapes; and more.

##### INTRODUCE SUSTAINABLE PRACTICES

TIME: 10 MIN

5. Show images or examples of landscape architecture projects.
  - Use projects you have worked on and/or projects in your community that the students may be familiar with. Use projects that focus on environmental sustainability as a tie-in to rain gardens and bioswales.
  - Ask students if they've visited any of the local places and what they think about them.



6. Explain that landscape architects are increasingly concerned about the sustainability of the landscapes they create.
  - Ask students:
    - What does sustainability mean?
    - How do they think sustainability applies to landscape architecture?
  - Define sustainable in relation to landscape architecture.
    - A sustainable site links natural and built systems to achieve balanced environmental, social, and economic outcomes, and improves quality of life and the long-term health of communities and the environment. Sustainable landscapes balance the needs of people and the environment and benefit both.
  - Explain how sustainability was designed into the projects you showed earlier.

#### INTRODUCE RAIN GARDENS & BIOSWALES

TIME: 5 MIN

7. Tell students that you'll focus on two types of sustainable landscape architecture projects—rain gardens and bioswales.
  - Ask students:
    - Do you know what a rain garden is? A bioswale?
8. Explain what a rain garden is and how a bioswale differs from a rain garden.
  - Cover these key points:
    - Rain gardens and bioswales are landscaping features designed to collect stormwater runoff from roofs, driveways, or other impervious surfaces. This reduces rain runoff by allowing stormwater to soak into the ground (as opposed to flowing into storm drains and surface waters which causes erosion, water pollution, flooding, and diminished groundwater).
    - Rather than rushing off into a storm sewer or a local waterway, the rainwater collects in a swale or garden where it is naturally filtered by plants and soil. Rain gardens and bioswales can cut down on the amount of pollution reaching creeks and streams.
    - Bioswales are not vegetated on the bottom and tend to be deeper basins where soil and rock filter the water, while rain gardens tend to be shallow and completely vegetated.
    - Rain gardens are at times confused with bioswales. Swales slope to a destination, while rain gardens do not; however, a bioswale may end with a rain garden.



**DISCUSS ENVIRONMENTAL BENEFITS**

**TIME: 10 MIN**

8. Introduce two ways rain gardens and bioswales promote sustainability: manage stormwater and filter pollutants.
9. Discuss stormwater management.
  - Ask students:
    - What happens to rainwater when it falls on and around our school?
  - Explain that water that runs off hard, impermeable surfaces eventually runs into storm drains, streams, rivers, lakes, and oceans. And, this stormwater runoff picks up a host of contaminants or pollutants on its way into storm drains, streams, lakes, and eventually, oceans.
10. Discuss pollutants in stormwater and their effects.
  - Ask students:
    - What kinds of things might rainwater pick up as it hits roads, roofs, driveways, and other impervious surfaces?
  - Prompt their thinking with some examples (e.g., motor oil, gasoline, industrial chemicals, insecticides, laundry detergent, paint, pet waste, cigarette butts).
  - Explain that these pollutants harm and even kill fish, plants, and other living organisms.
  - Discuss how pollution affects local drinking water. Explain where local drinking water comes from.
11. Summarize the environmental benefits of rain gardens and bioswales.
  - Cover these key points:
    - Bioswales and rain gardens can have a significant impact on the water quality in our communities. They offer a natural solution to water pollution.
    - Studies have shown that as much as 70 percent of the pollution in streams, rivers, and lakes has been carried there by stormwater. Rain gardens and bioswales allow some of the stormwater to soak into the ground; estimates are that it's about 30 percent.
    - The plants and soil in the rain garden or bioswale help to filter pollutants. Soils and plants have amazing powers to clean up polluted water by simply doing what they do naturally! Healthy soils and plant roots act like sponges, sopping up water and letting it slowly filter through.
    - As water soaks into the ground, soil and plant roots trap pollutants. Microorganisms in the soil and plants help transform many contaminants into harmless compounds. Some "waste" materials,



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like phosphates, actually nourish plants. In the end, clean water moves through the rocky subsoil and “recharges” groundwater supplies.

- An added benefit is that rain gardens and bioswales provide food and shelter for wildlife, especially when they’re planted with native plants.

### WRAP UP

TIME: 5 MIN

12. Based on how you plan to facilitate this activity, take one of these steps:
  - If you are facilitating only the 50-minute introductory session, refer to *Extensions to the Introductory Session* on page 8.
  - If you plan to have students actively participate in designing and building a rain garden or bioswale, explain how they will be involved. Refer to *If You Plan to Build a Rain Garden or Bioswale* on page 7 for suggestions on how to extend the activity.
  - If you plan to have students participate by documenting the building of the project and the results, explain how they will be involved. Refer to *If You Plan to Build a Rain Garden or Bioswale* on page 7 for suggestions on how to extend the activity.
13. Distribute the *Your Path to Landscape Architecture* brochure and the *Landscape Architecture FAQs* handout.
  - Point out the education and licensing required to become a landscape architect.
  - Point out the ASLA web address.
  - Suggest students look at the *The Roof is Growing!* educational program on the ASLA website. It provides information about green roofs—another type of sustainable project that provides many of the same environmental benefits as rain gardens and bioswales.  
[www.asla.org/greenroofeducation/](http://www.asla.org/greenroofeducation/)



## Suggestions for Extending the Activity

Suggestions for extending this Career Discovery activity, *Create a Rain Garden or Bioswale*, are provided below.

### EXTENSIONS TO THE INTRODUCTORY SESSION

If you only have time and resources to facilitate the 50-minute introduction, consider these suggestions for extending the activity.

- Give students web resources that provide more information about building a home rain garden. See Resources listed on page 9.
- Consider providing the teacher with lessons that explore the environmental benefits of rain gardens and bioswales. The following lessons are available via the web link provided below.
  - Role of Plants in Water Filtration
  - Water Pollution and Solutions
  - Rain, Rain Go Away
  - Rain Water Runoff

Go to this link and scroll down to locate the educational materials:

<http://fiesta.bren.ucsb.edu/~chiapas2/Education.html>

These educational materials were created by Dayna Yokum as part of her work in designing and implementing a sustainable water resources program in San Cristobal de las Casas, Mexico.

- Suggest teachers implement the ASLA *The Roof is Growing!* educational program. It is a web-based program about green roofs. Green roofs are another type of sustainable project that provide many of the same environmental benefits as rain gardens and bioswales.

Go to this link: [www.asla.org/greenroofeducation/](http://www.asla.org/greenroofeducation/)

### IF YOU PLAN TO BUILD A RAIN GARDEN OR BIOSWALE

Decide how to involve the students in the design and build process.

- Do you want them to participate actively in designing and building?
- Or will they participate by documenting the process and results?

#### ACTIVE PARTICIPATION IN DESIGNING AND BUILDING

If you want students to be active participants in the design and build of the project:

- In the introductory session, explain the analyze/design/build process to the students.



- As a homework assignment or as a hands-on lesson, have students analyze a site (school grounds; their home yard; a city park) where a rain garden or bioswale would be beneficial. Refer to one of the Resources on page 9 for guidelines on analyzing a site.
- In a classroom session, review the results of the students' analysis and have them design the rain garden or bioswale. Refer to the Career Discovery activity *Design a Reading Garden, Sessions 5–7* for ideas.
- In a classroom session, have students plan how to use native plants in the rain garden or bioswale. Refer to the Career Discovery activity *Sustainable Landscape Practices*.

#### DOCUMENT THE BUILDING AND RESULTS

- Show your final design for the projects to the students and share your process of analysis and design. Explain the building process and ask the students if they will assist you by documenting the process. Suggest they create a blog and/or write an article for the school or community paper.
- Work with a teacher to have students collect data to monitor water flow and volume, and water purity before and after installation of the rain garden or bioswale.





## Resources

These web-based resources provide information about rain gardens and bioswales.

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### RAIN GARDENS & BIOSWALES

Bioswales and Rain Gardens: Making Runoff a Resource

<http://extension.oregonstate.edu/hoodriver/sites/default/files/bioswalebrochureoct12.pdf>

This 2-page brochure created by the Oregon State University Extension Service Master Gardener Program provides a short overview of both rain gardens and bioswales along with easy instructions on how to build one.

How to Manage Stormwater: Rain Gardens

<http://www.portlandoregon.gov/bes/article/188636>

This 8-page pamphlet created by the City of Portland Environmental Services provides easy instructions for analyzing, designing, and building a residential rain garden.

Rain Gardens: A How To Manual for Homeowners

<http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf>

The 32-page pamphlet created by the Wisconsin Department of Natural Resources and the U.S. Geological Survey provides detailed information about how to size and site, build, plant, and maintain a residential rain garden.

Biofilters

<http://www.deq.state.or.us/wq/stormwater/docs/nwr/biofilters.pdf>

According to its creators, the State of Oregon Department of Environmental Quality, “this document is an attempt to compile the best available information on the design and use of biofilters (bioswales, vegetated filter strips, and constructed wetlands) so that those sites that may have an application of one or the other of these vegetated filtering systems will have information to make the best decision on the design, construction, implementation, and maintenance of these Best Management Practices. It is not a design manual but a practical, based on experience and knowledge of sites that implemented these BMPs, useful information on what works and does not work when designing, constructing, and operating them.”

Rain Garden Network

[www.raingardennetwork.com](http://www.raingardennetwork.com)

A website with useful information and resources connected with rain gardens.

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## **HANDOUTS**

*Landscape Architecture FAQs*



## Publicize and Document Your Activity

Don't let the effort you put into creating and implementing a Career Discovery activity go unnoticed!

Staff at ASLA National is always on hand to help promote your events to local media; feel free to contact them at anytime. If you would like to reach out to local media yourself, below are some tips to assure your name appears in print or online.

### **PUBLICIZE**

For tips on reaching out to local media, refer to the PR Handbook, available as part of ASLA's Chapter Operations Workbook. It is online at:

<https://www.asla.org/ChapterOutreach.aspx>

You'll find tips like these:

- Pitching the story to the media
- Formatting the press release
- Appealing to the audience
- Making the story relevant
- Social media tips

### **TAKE PICTURES & VIDEO**

Be sure to take lots and lots of pictures and video! ASLA National would love to share your activity online as inspiration for the other chapters.

Send us photos or video of your event featuring:

- Students interacting with professionals (we must have a signed photo release from parents to use the photos)
- Your presentation materials
- The activity in process
- The end result of your activity

### **DOCUMENT**

Email public relations and communications coordinator JR Taylor—at [jtaylor@asla.org](mailto:jtaylor@asla.org)—to report on the activity or activities that your chapter completes.



## National Academic Standards

The ASLA Career Discovery Program activities correlate to the national standards created by the Mid-Continent Research for Education and Learning (McREL). McREL is a nationally recognized, private, nonprofit organization dedicated to improving education.

Academic standards are the skills and knowledge base expected of students for a particular subject area at a particular grade level. In the U.S. standards are not “standardized.” There are published sets of national and state standards, and some cities and local communities have created their own. Local academic standards can be matched to the McREL national standards.

### **GEOGRAPHY**

Standard 8. Understands the characteristics of ecosystems on Earth's surface

Standard 14. Understands how human actions modify the physical environment

If students are designing and building the rain garden or bioswale, these standards will also apply:

### **WORKING WITH OTHERS**

Standard 1. Contributes to the overall effort of a group

### **MATHEMATICS**

Standard 2. Understands and applies basic and advanced properties of the concepts of numbers

Standard 3. Uses basic and advanced procedures while performing the processes of computation

Standard 4. Understands and applies basic and advanced properties of the concepts of measurement

Standard 9. Understands the general nature and uses of mathematics.

# Landscape Architecture FAQs

Landscape architecture is a profession committed to stewardship of the land while creating healthy, enjoyable, and secure places for the present and future. Landscape architecture combines art and science. It is the profession that designs, plans, and manages our land.

Landscape architecture has strong roots in the United States and early examples, such as Thomas Jefferson's Monticello, are still much admired. The actual term landscape architecture became common after 1863 when Frederick Law Olmsted and Calvert Vaux designed New York's Central Park.

## WHAT DOES A LANDSCAPE ARCHITECT DO ON THE JOB?

Landscape architects deal with the increasingly complex relationships between the built and natural environments. Landscape architects use sustainable design practices to plan and design traditional places such as parks, residential developments, campuses, gardens, cemeteries, commercial centers, resorts, transportation facilities, corporate and institutional centers, and waterfront developments. They also design and plan the restoration of natural places disturbed by humans such as wetlands, stream corridors, mined areas, and forested land. Their appreciation for historic landscapes and cultural resources enables landscape architects

to undertake preservation planning projects for national, regional, and local historic sites and areas.

## WHAT SKILLS DOES A LANDSCAPE ARCHITECT NEED?

- Sensitivity to landscape quality
- Understanding of the arts and a humanistic approach to design
- Ability to analyze problems in terms of design and physical form
- Technical competence to translate a design into a built work
- Skills in all aspects of professional practice including management and professional ethics

## WHAT ARE THE EDUCATION AND LICENSING REQUIREMENTS?

A formal education is essential to gain the skills and knowledge to become a landscape architect. Professional education in landscape architecture can be obtained at the undergraduate or graduate level. There are two undergraduate professional degrees. These usually require four or five years of study in design, construction techniques, art, history, natural, and social sciences. There are generally three types of graduate degree programs. For more information visit ASLA's Career Discovery page: [asla.org/yourpath](http://asla.org/yourpath)

At present, all 50 states license (or register) landscape architects. Each state sets its own requirements for registration, but all require candidates to pass a national examination (the Landscape Architect Registration Examination, or LARE).

## **WHERE DO LANDSCAPE ARCHITECTS FIND JOBS AFTER GRADUATION?**

Landscape architects are employed in private, public, and academic organizations. Private sector opportunities are found within landscape architectural, engineering, architectural, and planning firms. Landscape architects may also work with other types of private corporations that have physical planning departments, or offer products and services related to land planning and development. Public sector employment opportunities are found within federal, state, regional, and municipal agencies involved in land planning, development, and preservation. Landscape architects in academic practice teach and conduct research in the professional programs offered by colleges and universities across the country.

## **WHAT IS A LANDSCAPE ARCHITECT'S SALARY?**

Landscape architectural salaries vary depending on the years of experience, geographical location, and type of position. The average annual salary and bonuses for those in the landscape architecture field total \$78,600, according to the 2010-11 ASLA National Salary Survey.

For more information about a career in landscape architecture, visit ASLA's Career Discovery page: [asla.org/yourpath](http://asla.org/yourpath)