Environmentally Safe Gardening may be defined as the preparation, beautification, and maintenance of land by means that perpetuates and protects native surroundings, biotic, and abiotic factors. Biotic factors are defined as the living organisms within an ecosystem and abiotic factors are the nonliving organisms. (Goodman, Emmel, Graham, Slowiczek, and Schechter 1986)

Rationale For Environmentally Safe Gardening

The Hampton Roads area, which encompasses the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Suffolk, is undergoing a great deal of construction because of population influx and relocation of businesses. The result of this combination is the potential destruction of Hampton Roads ecosystems - the wetlands, forest, and beach areas. Education of its occupants to appropriate gardening methods would help in conservation of its natural resources, the people, waterways, native plants and animals. For example, a danger to Norfolk's water system is pesticides that are used to control garden pests. When applied in gardens the pesticides are carried to the water system via runoff of rainwater.

The water system includes ten constructed reservoirs in four cities in southside Hampton Roads and Isle of Wight County. The reservoirs are grouped into two main systems: the Intown System is made up of Lake Whitehurst, Lake Wright, Lake Taylor,
Little Creek Reservoir, Lake Lawson, Lake Smith and Stumpy Lake and the Western Branch Reservoir System includes Lake Burnt Mills, Lake Prince and the Western Branch Reservoir. The reservoir systems provide drinking water to 700,000 residents of Hampton Roads. This information was included in a letter to the public "Welcome to . . . The Norfolk Reservoir System" written by the David S. Rosenthal, Reservoir Manager.

In addition to the danger to water system, another hazard exists, that of the imbalance to the ecosystems of Hampton Roads. An ecosystem, as defined by Goodman et al. (1986), is "a physically distinct, self-supporting unit of interacting organisms and their surrounding environment."

The ecosystems supporting the Hampton Roads communities include:

a. watershed that supplies cities' reservoirs with drinking water;

b. native flora which stabilizes land and protects land against erosion by wind and rain;

c. fauna which has evolved into creatures resistant to diseases in this area, which are dependent upon flora, and which provides protection for flora by feeding on harmful organisms; and a
d. growing human population dependent on a balanced ecosystem.

The enrollees in this program will be of various ages, sexual orientation, socioeconomic, cultural, learning
abilities, and experiences. Individuals in this program will be at various life cycle stages (Knowles 1980) and, therefore, motivated by different issues and concerns. For example, younger adults between the ages of 18 and 35 are concerned about establishing their careers and home life. Middle-aged adults' interests, 35 to 55 years of age, include providing civic and social duties and older adults, 55+ years of age, are concerned with health issues, cultural issues, and spiritual awareness. The multitude of experiences, interests, and backgrounds of participants can only serve to enhance the curriculum content and delivery.

An environmentally safe gardening program is in harmony with the Earth. It perpetuates life in the Hampton Roads area, educates citizens in the safe practices of gardening, and exposes citizens to a philosophy that posits responsibility of humankind for their surroundings.

The aim of the program is to educate the community to the alternative or safer methods of gardening that support the ecosystems. The organization of the curriculum in condensed units of gardening topics is developed with the learners' needs, obligations, and time constraints in mind.
The common body of knowledge is landscaping. Landscaping is the planning, designing, and decorating of gardens and grounds. Within this topic are included the techniques of gardening, conservation of natural resources and management of resources for the coexistence of flora, fauna, and mankind.

**Aim of Environmentally Safe Gardening**

The aim of the environmentally safe gardening curriculum is to design an adult educational and "learn-by-doing" curriculum. In achieving this aim, the developed curriculum would provide a holistic perspective of the topic areas and create a responsible attitude in the Hampton Roads community. The ultimate aim of an environmentally safe gardening is to develop an attitudinal shift toward the traditional methods that have been used.

**Goals for Environmentally Safe Gardening**

The Environmentally Safe Gardening program will:

1. Guide learners to appropriate use of pesticides in their gardens, therefore, enhance their pride
of the community and their sense of stewardship;
2. Illustrate to learners the choices in plants available to recharge the groundwater supplies through reduction in water runoff;
3. Assist learners in identifying and choosing plants to attract beneficial organisms.
4. Assist learners in designing a garden that demonstrates water conservation;
5. Help learners identify and control invasive plants that destroy native plants and organisms creating unbalanced ecosystems.
6. Enhance the learners' knowledge by imparting information on current harmful gardening techniques practiced in the Hampton Roads' ecosystems.
7. Introduce learners to a variety of native flora that will, if placed in the garden, require very little maintenance and expense.
8. Develop positive attitudes in learners and love for stewardship of the land imparted to all human beings.

9. Apprise learners of the availability of natural gardening resources, which are relatively inexpensive.
Environmentally Safe Gardening Scope and Sequence
Adult Education Program

Week 1 -- A three-hour session - Landscaping in the Hampton Roads' Ecosystems

- Ecosystems in Hampton Roads
- Gardening Sizes
- Benefits of Environmentally-Safe Landscaping
Week 2 -- A three-hour session - Preparing Your Soil

- Identifying Soil Factors
- Soil Analysis
- Preparing Your Soil
- Soil & Compatible Plants

Week 3 -- A three-hour session - Mulching & Composting

- Making Compost
- Organic Mulches
- Mulch and Compost Application

Week 4 -- A three-hour session - Protecting the Watershed

- Landscape Practices to Protect Watershed
- Watering Techniques
- Plants That Work In Watershed
- Organic Weed Control
- Water-Wise Designed Landscape

Week 5 - A three-hour session - Attracting the Beneficials

- Birds, Insects, & Other Living Organisms
- Native Plants

Week 6 - A three-hour session -- Identification & Control of Invasive Plant Species

- Benefits of Native Plants
- Invasive Plant Threat
ENVIRONMENTALLY SAFE GARDENING
ADULT EDUCATION
LANDSCAPING IN THE HAMPTON ROADS' ECOSYSTEMS
Three-Hour Class

GOALS:

1. To develop in learners positive attitudes and love for the stewardship given to all human beings.
2. To enhance learners' knowledge by providing information on current gardening techniques practiced within the Hampton Roads' ecosystems.
3. To apprise learners of the benefits in practicing environmentally safe gardening.

RATIONALE FOR UNIT:

Landscaping in the Hampton Roads ecosystems is an introductory course that lays the foundation for all kinds of gardening in this unique region which consists of mixed forests and swamps. The Hampton Roads area is undergoing construction activity as a result of population influx, relocation of industries and businesses, and increase in military activity because of base closings across other regions of the United States. Many residents, new as well as long-time residents, are not aware of the impact of unsafe gardening techniques, such as improper use of pesticides and soil erosion, on the environment. Also, residents are unaware of the ecosystems in this area and the advantages of gardening safely. Introduction to Hampton Roads ecosystems, traditional versus alternative gardening techniques, and apprising learners of the responsibility inherent in residing in this region will have the potential effect of creating an environmentally safe region.

OBJECTIVES FOR UNIT:

1. To identify the various ecosystems that exist
in the Hampton Road's area so that learners will gain information about the environment and the variety of gardens the environment can support.

2. To realize the harmful effects pesticides and other chemicals have on the water systems throughout Hampton Roads.

3. To associate traditional garden practices with destruction of the ecosystem.

4. To identify support systems, private and governmental agencies, for residents in Hampton Roads who practice environmentally safe gardening.

5. To recognize the healing powers that exist in creating environmentally safe gardens.

6. To identify various size gardens that can grow in the Hampton Roads' region.

POSSIBLE ACTIVITIES:

1. Informal discussion of the current gardening practices used by learners and the affects practices may have on Hampton Road's ecosystems.

2. Invite guest speakers from a number of private and governmental environmental action agencies.

3. Visit on-site gardens of the Fred Heutte Center.


NOTES:

See resource page for possible contacts for guest speakers.


ENVIRONMENTALLY SAFE GARDENING
ADULT EDUCATION

PREPARING YOUR SOIL

Three-Hour Class

GOALS:

1. To expose learners to the foundation of creating gardens that soil can support with no or little addition of pesticides.
2. To provide learners with knowledge and understanding of soil types and understanding the importance of working with the environment.
3. To help learners take responsibility for the land by providing information on analyzing soil and providing information on types of plants which thrive in specific soils.
4. To reveal to learners the responsibility that all citizens have in environmental stewardship irrespective of socioeconomic status.

RATIONALE FOR UNIT:

Preparing soil for planting is the foundation for any type of gardening. Knowledge of the type of soil present on an individual's property would aid in their selection of appropriate plants suitable for a particular soil type. Soil types that support particular plants require no or little fertilization. Therefore, runoff from rainwater or other sources of water would not contaminate water systems. Identification of soil types would provide individuals with information on condition of soil and the types of organic matter to use to remedy soil deficiencies. Organic matter breaks down naturally with the help of microorganisms, thereby, causing no distress to the ecosystems. This knowledge would aid the learners in making appropriate decisions concerning providing natural nutrients for soil types and creating a garden
that works in conjunction with nature.

OBJECTIVES FOR UNIT:

1. To explore a number of alternative solutions to preparing soil without chemical compounds.
2. To identify soil types that exist in Hampton Roads.
3. To become aware of private businesses and governmental agencies that analyze soil types.
4. To associate various plants with soil types that support respective plants without the need of chemical compounds.
5. To analyze information concerning soil types and make decisions concerning plants that would thrive with no or little chemical fertilizers.

POSSIBLE ACTIVITIES

1. Gather soil from gardens and send to organizations or governmental agencies for analysis.
2. Informal discussion on soil types and the compatible plants.
3. Develop a list of compatible plants and their soil types.
4. Informal discussion on the benefits of using organic fertilizers vs. the benefits of using chemical fertilizers.
5. Develop a list of benefits and disadvantages of
organic fertilizers and chemical fertilizers.

NOTES:

See resource page for possible contacts for soil analysis.

References


Hampton Roads Gardening. 1998. The good earth: Preparing your soil is a cornerstone of gardening.
ENVIRONMENTALLY SAFE GARDENING
ADULT EDUCATION

MULCHING & COMPOSTING

Three-Hour Class

GOALS:

1. To expose learners to the hidden world of organisms that work to benefit the Earth and its beings.
2. To assist learners in appreciating the natural processes provided by nature and the benefits of natural processes.
3. To provide learners with the knowledge of man's ability to protect the land with natural materials while reaping the benefits.

RATIONALE FOR UNIT:

Mulching and composting play major roles in regenerating the Earth without using chemical compounds. Individuals have been bombarded with information on the benefits of using chemicals in
soils and in gardens to the exclusion of the dangers of using chemicals such as pesticides, insecticides, etc. Natural processes of regeneration and protection of the Earth have not been widely publicized. Exposure to the knowledge of natural processes and man's role in rejuvenating the Earth would develop a shift in gardening techniques and preservation of the natural resources of Hampton Roads.

OBJECTIVES FOR UNIT:

1. To summarize the benefits of composting and mulching.
2. To distinguish the differences in applying composting and mulching.
3. To become aware of the inexpensive process in mulching and composting.
4. To explore the relationship of composting and mulching to the restoration to the Earth's surface.

POSSIBLE ACTIVITIES:

1. Develop a list of natural materials needed for mulching and composting.
2. Invite organic farmers to demonstrate construction of compost bins and process of mulching.
3. Differentiate the benefits and drawbacks of mulching/composting and the benefits and drawbacks of using manmade materials/chemicals.
4. Research on the World Wide Web the
different ways of making compost.

- Informal discussion of practices currently used in gardens and alternative practices that will provide an environmentally safe Hampton Roads.

NOTES:

References

Fairfax County Waste Reduction and Recycling Program. Mulching and landscape alteration.


Fairfax County Waste Reduction and Recycling Program. Mulching and landscape alteration.
PROTECTING THE WATERSHED

Three-Hour Class

GOALS:

1. To assist learners in developing an appreciation for the Hampton Roads waterways which provide sustenance, commerce, and leisure.
2. To create a new attitude in learners to take responsibility in keeping Hampton Roads' environmentally safe by using alternative ways of gardening which protect its reservoirs and lakes.
3. To provide new ways of gardening which conserve the vital water supply.

RATIONALE FOR UNIT:

Protecting the watershed exposes the learners to alternative gardening techniques that preserve this natural resource. In practicing the new techniques, the learners help to provide healthy water for Hampton Roads' residents and other living creatures. Also, newcomers and transients who have been exposed to this unit will share this valuable information with others creating an entire country which practices environmentally safe gardening. The shores and banks of the Elizabeth River are eroding because of construction. Providing learners with new garden techniques for riverfront property would assist in restoration of the banks and shores. The Chesapeake Bay's blue crab population is threatened with chemicals that have seeped into its waterways. Imparting knowledge to learners on new techniques in gardening would curb the introduction of pollution into the Chesapeake Bay and its tributaries.
OBJECTIVES FOR UNIT:

1. To specify techniques used in designing water-wise landscaping.
2. To become aware of plants which need no or little maintenance.
3. To design a water-wise landscape.
4. To outline the organic techniques used in controlling weeds which results in protecting the watershed.
5. To appraise water techniques that conserve and protect this resource from pollutants used in gardens.

POSSIBLE ACTIVITIES:

1. Invite guest speakers from agencies that are involved in restoration and conservation of the Chesapeake Bay and the Elizabeth River.
2. Informal discussions on benefits to waterfront properties and entire communities that incorporate water-wise landscaping ideas.
3. Write letters to agencies asking for information of ways in which residents may help in water conservation.
4. Design a water-wise landscape.
5. Research techniques in using mulching that protect land as well as conserve water.
6. Develop a table of plants that support the watershed.

NOTES:
See resource page for possible contacts for speakers.

References


ENVIRONMENTALLY SAFE GARDENING
ADULT EDUCATION

ATTRACTING THE BENEFICIALS

Three-Hour Class

GOALS:

1. To expose learners to the natural processes and benefits inherent in creating landscapes that mimic natural forests and swamps.
2. To assist learners in developing appreciation of plants, microorganisms, insects and animals which provide beauty while naturally controlling the environment.
3. To develop in learners the value of the environment and the responsibility for assisting in the natural processes of Earth's regeneration.
RATIONALE FOR UNIT:

Attracting the beneficials is an integral part in control and restoration of the beauty of the Hampton Roads' region. Individuals are not aware of the benefits provided by microorganisms and animals in controlling pests and rejuvenating the environment. Many residents apply chemicals to gardens to control pests not knowing the processes provided by nature. Residents unaware of the imbalance created by traditional gardening techniques continue to unwittingly destroy the land and plants that support beneficial organisms. The unit reveals this knowledge while transforming citizens into responsible residents with a holistic perspective on gardening.

OBJECTIVES FOR UNIT:

1. To become aware of the natural habitats of animals, birds, insects, and microorganisms that exist in backyards.
2. To summarize the benefits in attracting native animals, birds, insects and microorganisms.
3. To integrate gardening techniques learned in order to attract native animals, birds, insects and microorganisms.
4. To construct a table of native plants which attract fundamental animals, birds, insects and microorganisms.

POSSIBLE ACTIVITIES:

1. Informal discussion of pests and current practices of controlling pests.
2. Develop a table of garden pests and the respective animals that feed on and control pests.
3. Invite guest speakers to demonstrate designing gardens that attract beneficials to Hampton Roads.
4. Research native animals, insects and microorganisms and list the insects they help control.
5. Apply for Elizabeth River Project certification of habitat.
6. Sketch a habitat design by drawing a map of property and sketch in native plants that should be added.
7. Brainstorm activity on homes for native animals that exist in nature and in backyards.
8. Field trip to a butterfly garden.

NOTES:

See resource page for more information on native plants.
References

Alliance for the Chesapeake Bay. Using beneficial plants: A homeowner's guide.


Rodale Institute Research Center. Attracting beneficials.

Virginia Department of Conservation & Recreation. Native plants for conservation, restoration, and landscaping.
ENVIORNMENTALLY SAFE GARDENING
ADULT EDUCATION

IDENTIFICATION & CONTROL OF INVASIVE PLANT SPECIES

Three-Hour Class

GOALS:

1. To assist learners in developing an appreciation for native plants and the benefits of native plants in the Hampton Roads' region.
2. To expose learners to dangers inherent in cultivating invasive plants in Hampton Roads' region.
3. To provide learners with the knowledge of using environmentally safe techniques in preventing and controlling invasive plant species.
RATIONALE FOR UNIT:

Identification and control of invasive plant species is an aspect of preserving the ecosystems of the Hampton Roads' area. Residents cultivate invasive plants because of their beauty, but are unaware of the invasive plants' ability to displace desirable plant species that provide shelter and food for living organisms. By attending this unit learners will become knowledgeable in recognizing and controlling invasive plant species and in creating a coalition with environmental agencies to restore and reclaim native plants and species.

OBJECTIVES FOR UNIT:

1. To analyze the benefits of native plant species within the Hampton Roads' ecosystems.
2. To integrate gardening techniques that will prevent growth of invasive plant species.
3. To explain the dangers of invasive plant species to the Hampton Roads' ecosystems.
4. To associate the traditional practices of gardening to the proliferation of invasive plant species.

POSSIBLE ACTIVITIES:

1. Invite speakers from private and governmental agencies to talk about the 115 invasive plant species that grow in Virginia.
2. Informal discussion about the traditional
gardening techniques, destruction of natural habitats and role assumed in proliferation of invasive plant species.
3. Sketch images of most popular native plant and invasive plant species existing in Hampton Roads' ecosystems.
5. Research selected invasive plant species and list dangers to Virginia's habitats.
6. Brainstorm activity on ways to control invasive plant species.

NOTES:

References
Resources

Possible contacts for soil analysis:
Possible contacts for speakers:

Alliance for the Chesapeake Bay
6600 York Road
Baltimore, MD 21212
Tel. No.: 410-377-6270

Melissa Pease
The Elizabeth River Project
801 Boush Street
Norfolk, VA 23510
Tel. No.: 757-625-3648

Dawn Alleman
Extension Agent
Environmental Horticulture
Virginia Cooperative Extension
401 Colley Avenue
Tel. No.: 757-683-2818

Possible contacts for information on invasive plant and native plant species:

Department of Conservation and Recreation
Division of Natural Heritage
203 Governor Street
Richmond, VA 23219
Tel. No. 804-786-7951
http://www.state.va.us/~dcr/vaher/htm

Virginia Native Plant Society
P. O. Box 844
Annandale, VA 22003
Tel. No. 540-568-8679
http://www.hort.vt.edu/NVPS

Department of Forestry
Fontaine Research Park
900 Natural Resources Drive
P. O. Box 3758
Charlottesville, VA 22903-0758
Tel. No.: 804-977-6555
http://www.state.va.us/~dof/dof.htm

Virginia Coastal Resources
629 East Main Street
Richmond, VA 23219
Tel. No.: 804-698-4323
http://www.deq.state.va/us/envprog/coastal.htm

Chesapeake Bay Program
410 Severn Avenue, Suite 109
Invasive Plant Species

WHAT HAVE YOU LEARNED?

1. Sketch two different types of invasive plants

2. Label the plants with appropriate names.

3. Specify at least one affect the invasive plants have on Virginia's ecosystems.
Mulching & Composting

WHAT HAVE YOU LEARNED?

Answer both parts of statement #1 or statement #2.

1. List five natural products that may be used as mulches.

   B. Explain where you would apply or place the mulches.

2. A. Sketch a compost bin

   B. List the things that you would place in
VALIDATION OF ENVIRONMENTALLY SAFE GARDENING CURRICULUM

I would send a copy of my curriculum to the Norfolk office of the Virginia Cooperative Extension, attention to a subject matter expert, Dawn Alleman, extension agent of environmental horticulture, asking for her opinion on the scope and content of the curriculum. This office is a consortium of Virginia Polytechnic Institute and State University and Virginia State University. The office provides gardening and environmental information to Norfolk residents and residents of other Hampton Roads' cities. Also, the office provides technical training to residents who desire to become trainees under the auspices of the Master Gardeners' Program. To hone their skills and stay abreast of current garden practices, Master Gardeners must volunteer to maintain gardens at least once a week in designated gardens and participate in training interested individuals.
April 19, 1999

Ms. Dawn M. Alleman
Extension Agent
Dear Ms. Alleman:

Re: Critique of the attached curriculum, "Environmentally Safe Gardening"

As a class project for a graduate-level class and as a service to the Fred Heutte Center, I have developed a curriculum that would develop residents into gardeners that practice safe horticulture techniques.

I am an interested resident and a graduate student curious about the environment of Hampton Roads and would appreciate your reviewing my curriculum and giving me feedback about its scope and content. I have provided a survey for your convenience and a copy of the curriculum. Please feel free to write comments on the curriculum as well as on the survey.

If you have any questions, please feel free to phone me at home, 757-549-0038, or at work, 757-441-2513.

Thank you for assisting me in this project.

Sincerely,

Vivian Carter
SURVEY OF
ENVIRONMENTALLY SAFE GARDENING CURRICULUM

1. Does the rationale of each unit persuade you that the units need to be presented to the community? ____ Yes ____ No
   If not, how might I improve the rationale for each unit?

2. Does content structure illustrate the main concern of practicing environmentally safe gardening? _____ Yes ______ No
   If not, what may I do to improve the content structure?

3. Does content flow so learners will be able to build on knowledge from previous unit? ____ Yes ____ No
   If not, how may I improve the flow of the content?

4. Are any units missing from the curriculum?  ____ Yes ____ No
   If yes, what units should be added?
5. Were learning activities appropriate for level of learners? ____ Yes ____ No
   If no, what activities would be appropriate?

6. Will achievement of goals make learners a user of the knowledge? ____ Yes ____ No
   If no, what goals should be included in curriculum?

OTHER COMMENTS: (Use the back of this form for additional comments.) Thank you.