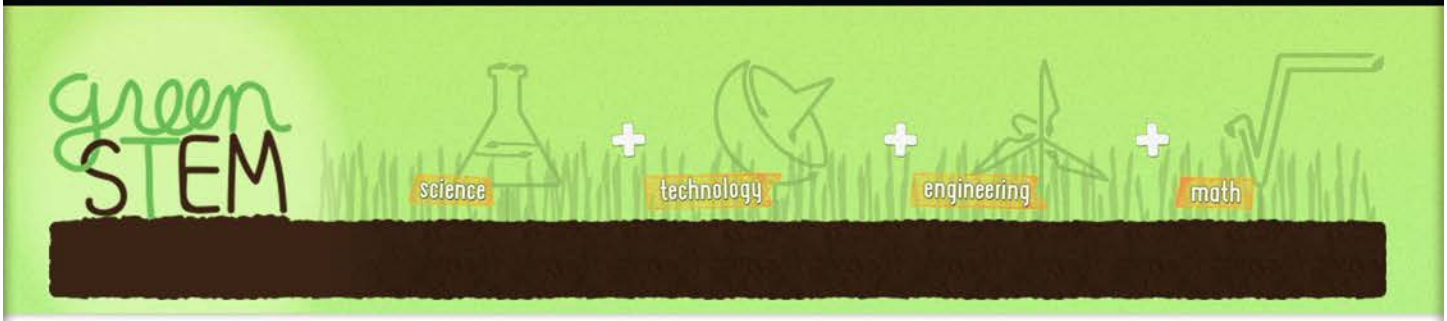

We Can Make a Difference

Grade Levels: 6 – 12

Objective: To evaluate the needs of the school community and generate ideas for an environmentally focused Service-Learning project. To identify potential community partners for the project.

Standards:

National Science Education Standards

Unifying Concepts & Processes; Standard A - Science as Inquiry; Standard E - Science & Technology; Standard F - Science in Personal and Social Perspectives

National Council of Teachers of Mathematics Standards

Numbers & Operations: 6-8; Measurement: 6-8; Problem Solving: 6-8; Communication: 6-8

National Educational Technology Standards

Standard 1 - Creativity and Innovation; Standard 3 - Research and Information Fluency; Standard 4 - Critical Thinking, Problem Solving, and Decision Making

Virginia Standards of Learning

Science: 6.9, LS. 11, LS.12

Mathematics: 6.1, 6.2

Computer/Technology: 6-8.5, 6-8.6, 6-8.8

Maryland State Curriculum (Grade 6-8)

Science: 1A, 1B, 6A, 6B

Mathematics: 1.B, 4.A, 4.B

Technology Education: Engineering Design and Development

This material is based upon work supported by the Corporation for National and Community Service under Learn and Serve America Grant No. 09KSSVA002. Opinions or points of view expressed in this document are those of the authors and do not necessarily reflect the official position of the Corporation or the Learn and Serve America Program.

Background: Students will tour the school cafeteria and grounds and identify any concerns. They will list the negative aspects of leaving these areas in their current condition, make a list of people who could benefit from refurbishing these areas, then make a list of people who could help make the school environment a more environmentally-friendly place. This activity focuses on 3 environmental topics, energy usage, waste management and green landscaping. The students will develop and implement a plan to improve the school's ability to conserve energy and reduce waste while collecting data about energy usage and conservation, sustainable materials and the benefits of recycling and the benefits of green landscaping. The relationship of recycling and green landscaping to energy conservation will also be explored.

Materials:

Pencil

Paper

Clipboards

Large sheets of paper

Markers

Index cards

Video clip: http://www.youtube.com/watch?v=nGyutkBvN2s

Procedure:

1. Give each student a clipboard and a pencil. Ask the students to divide two sheets of paper into fourths. Label one sheet "cafeteria" and the other "grounds". Write one of the following headings in each box:
    a. What do you already know?
    b. What do you notice?
    c. What do you want to know?
    d. What do see this looking like in the future?
2. Take a tour of each location. Ask students to fill in their charts and write down as much information as possible in each box. Ask the students to be very specific.
3. When the students return from their tour, lead a class discussion of their findings.
4. On a large sheet of paper, write the following questions
    a. Who would benefit from a change?
    b. Who could help us make these changes?

c. How would lives be changed as a result?

d. What does the word “meaningful” mean to you?

5. Post one sheet of paper on each classroom wall and have the students use a marker to write their thoughts related to each question. These answers should be based on information gathered while touring the school and grounds. The students should not discuss their ideas with each other but are welcome to read other people’s comments.

6. Have the class watch a video clip: “Be the Change that you want to see in this world.” Ask students to write down the positive impacts of change made by the small boy in the beginning.

7. Lead a class discussion of the students’ answers on the large sheets. During this discussion, help the students identify several possible project topics and potential partners.

8. Have students write a brief summary on an index card of what change they want to make in the school community.

Observations & Conclusions:

1. Identify ways in which the school can conserve energy.

2. How much waste does the school generate on a monthly basis

3. How can green landscaping improve the school grounds?

E

Extensions:

Interview the students on video as they share their ideas and help them develop ideas for public presentations and public service announcements.

Green Jobs and Careers:

The Bureau of Labor Statistics (http://www.bls.gov/green/) defines green jobs as:

“Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources.” And “Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.”

1. Have students investigate the types of jobs are suited to their personality, skills and interests by using these online resources. The personality test center helps identify career options based on personality indicators and the O*NET tool uses interests and skills to suggest potential careers. Students can choose to use both tools and compare the results or use each tool individually.

a. Personality Career Tool Activity: Complete your Meyers Briggs type indicator at the online site.

i. Go to www.personalitytest.net/cgi-bin/q.pl

ii. Answer the 68 quick "either/or" questions. Choose your best answer to each question.

iii. When you click "RESULTS" your personality type will be listed.

iv. With your four letter reference type, choose an occupation from the list that might help suit your type and is a job that you might be interested in exploring.

v. The listing can be found by clicking "Green Jobs List" at http://www.ctenergyeducation.com/greenjobs.htm

vi. Do a web search of the listed resource sites and other sites to find out more about the job you chose.

- What training/background is required?
- What is the entry-level pay or average pay for this occupation?
- Do there seem to be any jobs available in this occupation? If so where are they?
- After completing your research are you more or less interested in this occupation that when you started? Explain why.

b. O*NET Interest Profiler Activity: Complete the O*NET Interest Profiler

i. Go to http://www.mynextmove.org/explore/ip and complete the interest profiler

ii. Answer the quick 60 questions with your best answers for each question.

iii. When you have finished your interests will be shown in a graph, click Next to see the jobs suited to your interests.

- Where any of the jobs you chose green jobs? If not you can go to www.onetonline.org/find/green to search the green economy jobs sector.

iv. For the jobs listed, choose ones you are interested in.

- What training/background is required?
- What is the entry-level pay or average pay for this occupation?
- Do there seem to be any jobs available in this occupation? If so where are they?
- After completing your research are you more or less interested in this occupation that when you started? Explain why.

2. Have the students investigate green jobs related to their project topics. Suggested resources:

http://www.bls.gov/green/greencareers.htm

Service-learning Projects:

Have students design a service-learning project implementing a green solution at your school or in your community.

1. Create a brochure or display explaining the project topics. Share this information at community or PTA meeting or Earth Day celebration.
2. Develop a fun lesson for K-2 students at the school. Have upper-grade student present this lesson to the young students in the school.

To learn more about service-learning, visit www.servicelearning.vcu.edu and http://www.servicelearning.org/what-service-learning.

Lesson Plan based on an activity developed by

Elizabeth Day and Anita Otey

New Kent Middle School

New Kent County Schools

New Kent, Virginia

Green Jobs and Careers Extension based on an activity developed by

Rob Kincade

Mathews High School

Mathews County Public Schools

Mathews, VA

VCU VIRGINIA COMMONWEALTH UNIVERSITY Make it real.

GreenSTEM@VCU Unit Plan

Developed by:
Elaine Childress
Pamela A. Gilliam

L.F. Addington Middle School
Wise County Public Schools
Wise, Virginia

It's Good to be Green

Unit Description

Unit Overview

The focus of this unit will be on the conservation of natural resources and how individuals have a direct impact on their environment. Students will learn how they can better their school and community through Service-learning using STEM while reinforcing VA Standards of Learning taught throughout the year. The students' main project will be to establish an afterschool ecology club and recycling program in order to explore and help educate each other on how to reduce their own ecological footprint through recycling. Students will also work together to research, designing, and plant a butterfly garden on school grounds.

Unit Context

The unit will begin with introducing students to the concept of Servicing-learning, in particular "student voice", and introducing how we can incorporate these concepts into school "GreenSTEM" projects. We will then discuss which projects would better benefit our school and community and how to implement these projects. Each lesson will focus on how we, as individuals, impact the environment in both beneficial and harmful ways. By establishing an ecology club at their school, students will be conserving natural resources and educating others how to do so. Also, by planning and constructing a butterfly garden on school grounds, students will learn how to lesson their carbon footprint. Students will learn about green jobs by consulting with gardeners in the community, local professionals, and forestry service personnel. The projects will integrate the all the STEM disciplines of science, technology, engineering, and math. Students will calculate their ecological footprint, experiment to gain better understanding of the carbon cycle,

This material is based upon work supported by the Corporation for National and Community Service under Learn and Serve America Grant No. 09KSSVA002. Opinions or points of view expressed in this document are those of the authors and do not necessarily reflect the official position of the Corporation or the Learn and Serve America Program.

calculate the carbon biomass of trees, and calculate the area of the habitat garden, study habitats and plants indigenous to Southwest Virginia. Students will study the importance of recycling, create graphs analysis plant growth, and explore jobs in the ecology field. Students will study the science of ecology and collect scientific data, technology will be used in research, engineering will be used in the construction of the garden, and math will be used in the measurements and calculations of the garden. Essential questions that will be asked are: How does my individual carbon footprint effect our environment? How will we establish an ecology club and recycling program at our school? How will the establishment of an ecology club and recycling program at our school affect the environment for the better? How will we plan to build a butterfly garden? How will the construction of a butterfly garden better our school environment?

Standards & Goals

Goals:

1. Students research the carbon cycle
2. Students research ecology career fields and technology.
3. Students learn and research in ecology areas such the importance of recycling and creating a school garden.
4. Student voice will be an important part of their Service - learning project

Duration & Intensity

The unit will take place over the course of the year. The unit will cover the Service- learning concepts of investigating community needs, preparation for service, action, demonstration of learning, study of impact, and celebration.

Meaningful Service

By establishing an ecology club and recycling program at their school, students will encourage other students, staff and family members to practice recycling and other activities that will benefit the environment and community. Also, by planting a butterfly garden students will be improving the quality of the school environment as well as providing a natural habitat.

Links to Curriculum

By participating in this unit, students will be exposed to VA Standard of Learning objectives and STEM objectives that correlate with the investigative process, collecting of data, calculations, study of habitats and the environment, and the use of technology to conduct research.

Youth Voice

Students will use their voice in all aspects of the establishment of the ecology club. This will include the planning, implementation, and reflection of all projects. Students will use their voice to interact with members of the community to gain knowledge about gardening, recycling, and environment, and also to obtain resources.

Partnerships

External partnerships for project will include Town & Garden representatives, University of Wise Science Professors, U.S. Forestry professionals, Lowes Home and Garden Center personnel, Keep Wise Beautiful personnel, parents, and other volunteers. Internal partners at the school will include all participating faculty and staff, including administrators, teachers, janitors, and other students.

Diversity

Students will work together in all aspects of planning and implementing the projects. This will enable the students to develop team working skills such as decision-making and problem solving skills. In addition, students will learn tolerance and patience while working with other students that may come from a different background. Their service learning project will also expose students to the importance of community service and how we all benefit from the positive actions of a few.

Reflection

Reflection activities will occur for the duration of the project and school year. These activities will include classroom discussions, completion of a Know What? Chart as a pre-, during, and post- reflection exercise, discussions with community partners and family members, peer discussions, oral presentations, data charts and graphs, and media activities, such as the filming of an ecology news report, and writing of an ecology club news articles or media reflections.

Assessing Impacts

The impact of the ecology club and all projects will be assessed by the close examination of all reflection activities. All persons involved will be asked if any areas of the project can be improved. Also, teachers and students will examine ways of sustaining the ecology club, recycling program, and butterfly garden for the next year and many years to come.

Sharing & Celebrating

Students will use technology to generate reports for our local school district and in house T.V. station, the 6th grade language arts teacher will assist students in creating a newsletter, students may also compose plays, songs, and/or media ads to reflect learning and educate their community. Students will also share with lower grades how they created the garden and what they have learned. There will be a final

celebration for the year planned for Earth Day in which students in the ecology club will share with all who attend the success of the projects.

Service-Learning Goals

Service-learning goals that we hope to accomplish with this unit will be to build effective collaborative partnerships between our students involved and with our local college, schools, and other institutions and organization. Students will also engage parents, school faculty, and administration in supporting student learning projects. Students will assess and meet community needs through the service projects conducted. As educators, we hope to provide engaging and productive opportunities for young people to work with others in their community to instill the importance of community service. Students will build character and social skills by actively participating in all aspects of the planning and implementing of the project with other students. Thus, decision-making and conflict resolution skills will be a must. Students will be exposed to "Green Jobs" by participating activities and active discussions with Keep Wise County Beautiful members and the U.S. Forestry Service.

State and National Standards

Students will calculate their ecological footprint, experiment to gain better understanding of the carbon cycle, calculate the carbon biomass of trees, and calculate the area of the habitat garden, study habitats and plants indigenous to Southwest Virginia. Students will study the importance of recycling, create graphs analysis plant growth, and explore jobs in the ecology field. Students will study the science of ecology and collect scientific data, technology will be used in research, engineering will be used in the construction of the garden, and math will be used in the measurements and calculations of the garden.

Standards that will be covered are:

Science—4.3-4.6, 5.1, 5.3, 5.7

Math—5.1-5.18, 5.20-5.22

Technology-- C/T 3-5.1-- C/T 3-5.8

English—5.1-5.3, 5.6-5.9

Science-- 6.1-6.7, 6.9, LS.1

LS.4-LS.14, PS.4-PS.7, PS.9-PS.11, ES.1- ES.4B, ES.7, ES.9, ES.13,

Math— 6.1-6, 6.6-6.23, 7-14, 7.16-22, 8.1-8.4, 8.6-8.18

Technology— C/T 6-8.1—C/T6-8.9

English— 6.4-6.7, 7.1-7.9, 8.1-8.9

Civics—CE.4, CE.14

Assessment Plan

Student progress will be measured by reflection activities, team working skills, oral presentations to lower grades, by students created news reports, poems, or stories, and by the successful implementation of the ecology club, recycling program, and butterfly garden.

Impact on the Community and Partners

We hope to positively impact the community and partners by facilitating student communication with community members and partners. We hope that positive relationships will be built between students, community members, and partners that will last a lifetime. We hope to positively impact the community ecologically and esthetically by planting the butterfly garden on school grounds. We also hope to lessen landfill disposal in our community by establishing the recycling program at our school.

Lesson Title: Let's Hear Your Voice

Students will participate in different activities in order to better understand what their "student voice" is and what environmental issues interest them.

Standards of Learning Objectives:

Standards that will be covered are:
Science—4.3-4.6, 5.1, 5.3, 5.7, 6.1-6.7, 6.9, LS.1, LS.4-LS.14, PS.4-PS.7, PS.9-PS.11, ES.1- ES.4, ES.7, ES.9, ES.13,
Technology-- C/T 3-5.1-- C/T 3-5.8
English—5.1-5.3, 6.1-6.3 7.1-7.3, & 8.1-8.3

Methods and Activities: Students will be shown the Learn and Serve America and NYLC Lift websites, to make students aware of issues they may want to address. The students and teachers will look at World Mapper: to show disproportion between third world countries and North America. Students will be shown the dosomething.org website where they will examine, with the teacher, different environmental concerns and causes. Students will then be asked to write an environmental concern down on a piece of paper. The students will then share their concerns with the class. Students will then be asked to consider what environmental issue could be the main focus of our Service-learning project.

Materials/Resources

Pencil/paper

Websites:

www.dosomething.org

www.worldmapper.org

http://lift.nylc.org/

http://www.learnandserve.gov/

What Can We Do?

Students identify the impact humans have on the ecosystem and identify positive ways these problems might be corrected.

Standards of Learning Objectives:

Science—4.4-4.5 4.9, 5.1, 5.3, 5.7, 6.1, 6.3, 6.5, 6.6, 6.9, LS.4, LS.6, LS.11

Technology-- C/T 3-5.1-- C/T 3-5.8

English—5.1, 6.1, 7.1, 8.1

Methods and Activities:

Content/Teacher Notes:

Humans have the knowledge and ability to change the environment to satisfy our needs. These environmental changes have altered many aspects of our ecosystems in negative ways that affect all organisms on Earth. Many laws have been passed within the last 30 years to help reduce air and water pollution; however, students must realize that all responsible citizens of the world must commit to the conservation of resources. By recycling solid wastes, saving water, and reducing the use of fossil fuels, we can make Earth cleaner and preserve resources for generations to come.

Introduction:

1. Introduce the concept of conservation by asking the following questions:
   - Who recycles at home?
   - Why are people encouraged to recycle? (Recycling materials, such as aluminum and paper, can reduce

the amount of solid wastes in our landfills and can reduce the need for additional new materials.)

- What are some other ways we can conserve resources? (Moderate thermostat settings at home; drive smaller, more fuel-efficient cars; take shorter showers)

2. Tell students that today they will become energy sleuths in their school habitat.

Procedure:

1. Divide the class into pairs of students. Give each pair a data sheet, and explain that they will be taking a survey of the negative impact humans have had on the ecosystem of their school.
2. Monitor the students as they walk the school grounds and interior looking for signs of negative impact on the ecosystem by man. Instruct students to record their findings on the data sheet.
3. After returning to the classroom, discuss the results of the students' surveys. Compile all data into one set of classroom data on a transparency copy of the data sheet.
4. Have the students brainstorm ways they can be instrumental in changing some of the problems.

Even though some problems may seem out of their control, inform students that they can write letters to the people who do have control to convey ideas for correcting the problems. Also, through civic-minded activities, like service-learning projects, students can institute change for the better.

5. Have students share their results with other classes as a culminating activity.

Observations and Conclusions:

1. Ask the following questions in order to further discussion:
   - How have pollution problems discovered during the survey affected other living organisms in the ecosystem?
   - Can you have any affect on the improvement of your environment?

Follow-up/extension:

- Provide pictures of ecological problems (e.g., air pollution, erosion, litter), and have students offer solutions.
- Have the students write a story about a 200-year-old tree on the school property and the changes it would have seen over the last 100 years.
- Have students take digital photographs of an ecological problem before and again after they have solved the problem.

• Have students make a presentation to the PTA and ask for their support of projects to improve the environment.

• Have students make posters highlighting environmental problems to display in the hallways of the school.

• Have the class speculate as to what the schoolyard looked like 200 years ago. What kind of organisms would they have found there? Have any of these disappeared due to the negative impact of man on the environment?

• Have students do a similar survey of the ecosystem in their neighborhood or in their house.

• Have students read a book about pollution and share their thoughts about the story.

Materials/ Resources/Partners

Materials needed:

• Blank transparency

• Data sheet

Resources:

• Chesapeake Bay Program: America's Premier Watershed Restoration Partnership. http://www.chesapeakebay.net/. Provides articles and other resources on the Chesapeake Bay's natural resources.

• Connections: Connecting Books to the Virginia SOLs. Fairfax County Public Schools and The College of William and Mary. http://www.fcps.edu/cpsapps/connections. Presents a database of more than 1,000 works of children's literature and their connection to the Virginia Standards of Learning.

• Lessons from the Bay. Virginia Department of Education. http://www.pen.k12.va.us/VDOE/LFB/. A resource for grades 3–6, including 16 lessons concerning watersheds and the negative human impact on the environment, specifically the Chesapeake Bay.

• Outstanding Science Trade Books for Students K–12. National Science Teachers Association (NSTA). http://www.nsta.org/ostbc.

• Pollution Solutions. http://www.deq.state.va.us/education/polsul/. A curriculum supplement about litter and pollution prevention based on the Standards of Learning for grades K-12

• Project Learning Tree. American Forest Foundation. http://www.plt.org/. Provides details on this national environmental education program. Science Enhanced Scope and Sequence – Grade 4
Virginia Department of Education 41

• Project WET (Water Education for Teachers). http://www.projectwet.org/. Offers watershed resources through an online store.

• Project WILD. Council for Environmental Education. http://www.projectwild.org/.

• Search for Literature: Literature for Science and Mathematics. California Department of Education. http://www.cde.ca.gov/ci/sc/ll/ap/searchlist.asp. Offers a searchable database.

• Virginia Naturally: Linking Virginians to the Environment. http://www.vanaturally.com/. Offers environmental resources for teachers.

• Virginia Naturally School Recognition Program. Virginia Department of Game and Inland Fisheries. http://www.dgif.state.va.us/education/van_school_recognition.html.

*Lesson as described in the Virginia Department of Education, Science Standards of Learning, Enhanced Scope and Sequence for Grades 3 through 5.

Gardening: A Math Adventure

*Lesson as described on the Michigan Department of Agriculture and Rural Development website: http://www.michigan.gov/mdard/0,1607,7-125-2961_2971-67123--,00.html

The teacher will:

Help students understand how math computations can be applied to a "real life" situation (planting a garden).

Help students learn about cooperation and teamwork by making decisions about their garden.

The Students will:

Apply math computation skills (addition and multiplication) to a real life situation.

Follow step-by-step directions to complete a class garden.

Use group decision-making skills to determine the kinds of items a garden will have.

Create graphs from groups of information.

Standards of Learning Objectives:

Science—4.4-4.5 4.9, 5.1, 5.3, 5.7, 6.1, 6.3, 6.5, 6.6, 6.9, LS.4, LS.6, LS.11

Technology-- C/T 3-5.1-- C/T 3-5.8

English—5.1, 6.1, 7.1, 8.1

Math—5.4, 5.8, 6.3, 7.3

Methods and Activities:

Introduction:

Gardening is the cultivation of plants, usually in or near the home, as a hobby. Gardening is closely related to horticulture. Horticulture is the growth of fruits, vegetables, flowers, shrubs, grass, and trees. Plants are made up of roots, stems, and leaves. The roots help to anchor the plant in the soil. They also absorb water and minerals to promote plant growth. Stems of plants are various shapes and sizes. Twigs, branches, and trunks are all stems of plants. Some stems grow partially underground, but most stems grow above ground. Stems support the leaves and flowers of plants so they can receive an adequate amount of sunlight. Leaves have the job of providing food for the plant. The leaves need sunlight, which provides energy to combine carbon dioxide, water, and minerals to make food for the plant. This process is called photosynthesis.

Plants are important to all living things. They provide us with oxygen to breathe, food to eat and clothes to wear. Some plants also provide us with wood to build homes and many other things. We get food from many different parts of the plant. Some foods, such as carrots and sweet potatoes, are actually the roots of the plant. Corn, soybeans, and wheat are seeds of the plant. These three types of seeds provide us with food that is used to make many foods and products. We eat the leaves of plants when we eat lettuce and celery. Broccoli and cauliflower are actually the flower buds of plants. Oranges, bananas, and apples are the fruits of plants.

Plants also provide us with clothing, wood, and medicine. Cotton plants provide us with cotton for many different types of cloth products such as clothing, sheets, and curtains. Trees provide us with lumber so we can make paper, furniture, and most importantly, houses. Wood is also used in various parts of the world for people to burn for heat to cook food and to keep their homes warm. Plants also provide us with medicines like quinine, digitalis, and cortisone, to help treat human diseases and conditions.

Students can plan and plant a garden right on the school grounds. This project is an exciting way to teach math using addition, multiplication, bar graphs and line graphs. From the beginning lay-out to the bountiful harvest, fun math situations can be worked repeatedly. Students will understand that math is needed in the “real” world, and it can be a lot of fun.

Types of Gardens to Plant:

Rainbow gardens: Identify flowers and other plants that will add color and interest to your garden.

Soup and salad gardens: Think about favorite soups and salads – then grow them! Vegetables may include lettuce, tomatoes, spinach, carrots, celery, radishes, onions, cucumbers, potatoes, peas, and corn.

Butterfly gardens: Choose varieties of plants that attract butterflies. A helpful book may be Landscaping for Wildlife by Carrol Henderson.

Materials Needed:

Graph paper

Colored pencils

Pencil

Paper

Various seed packages (examples include pumpkin, corn, cantaloupe, carrots, onions, tomatoes, and green beans)

Activity Outline:

Have your students design a layout of a garden. First, they must decide what they would like to plant in their garden. For example, your students may choose pumpkin, corn, cantaloupe, carrots, onions, tomatoes, and green beans.

To design the layout of a garden, each student will construct a small model of a garden using colored pencils on graph paper. Each color will represent a different plant. (For example, a plant that spreads four feet will be four squares wide and four squares high.) Information included on seed packages will be helpful in planning the layout of the garden. *Do not let students begin this project until you have relayed all information in steps 1-5 of this activity outline. If they begin now, they will not have room for tilling.

Here is a sample of the space used for various plants:

Pumpkin 4 feet

Corn 2 feet

Cantaloupe 5 feet

Carrots 1 foot

Onions 1 foot

Tomatoes 2 feet

Green Beans 2 feet

Total 17 feet

When coloring the area used for plants, three feet should be allotted between each row of plants for tilling. Since the sample garden (including the plants listed in #1) has seven different plants, there will need to be six

tiller spaces between the rows. A three-foot border on each side of the garden is also needed for tilling space. Here is a diagram showing the sample garden discussed above with 30-foot rows:

Ask your students to find the length and width of their gardens.

To find the length, either count the squares or add together the length of the rows and the tilling space on the borders. The length of the rows in the sample garden is 30 feet and the tilling space needed on the borders is six feet (three feet on each end), so the total length is 36 feet.

To find the width, either count the squares or add together the total feet of the rows, the tilling space between the rows, and the tilling space on the borders of the garden. In the sample garden, the total feet of the rows is 17 feet, the total tilling space between the rows is 18 feet, and the total tilling space needed on the sides of the garden is six feet, so the total width is 41 feet.

If possible, allow your students to plant a garden at your school using one of the graph paper models. The expenses for this project will include the cost of the seeds, fertilizer, and organic pesticides. The soil will need to be tilled or plowed prior to planting. The seed packages vary in price. One packet of seeds is sufficient for at least 60 feet of space. An average sack of fertilizer will cover 1,500 square feet. The sample garden discussed above is 1,476 square feet (36'x41'), so an average sack of fertilizer will be sufficient.

As the garden produces vegetables, the class can keep a record of the harvest. Plotting the daily result on a line or bar graph is an excellent way for students to learn how to display data and compare at a glance the production of the plant. Since the garden will be growing over the summer, your students may end up charting the harvest at the beginning of their school year and planting a garden at the end.

Discussion Questions:

Which vegetables will need the most space in our garden?

Which vegetables will need the least space?

If we doubled the size of our garden, what would its new area be?

How many bag of fertilizer will our new garden need?

Figure the average price of a package of seeds using the seeds we have purchased.

Create a bar graph displaying the cost of each package of seeds. Which seed cost the most? Which seeds cost the least?

Let's Hear Your Voice

Students will participate in different activities in order to better understand what their "student voice" is and what environmental issues interest them.

Standards of Learning Objectives:

Science—4.4-4.5 4.9, 5.1, 5.3, 5.7, 6.1, 6.3, 6.5, 6.6, 6.9, LS.4, LS.6, LS.11
English—5.1, 6.1, 7.1, 8.1

Methods and Activities: Students will be shown the Learn and Serve America and NYLC Lift websites, to make students aware of issues they may want to address. The students and teachers will look at World Mapper: to show disproportion between third world countries and North America. Students will be shown dosomething.org website where they will examine with the teacher different environmental concerns and causes. Students will then be asked to write an environmental concern down on a piece of paper. The students will then share their concerns with the class. Students will then be asked to consider what environmental issue could be the main focus of our Service-learning project.

Materials/Resources/Partners

Pencil

Paper

Could a Green Job be in Your Future?

*Lesson based on activities listed on the Alliance to Save Energy's Green Schools Program website, "A Green Future for You" by Matt Evans and Earth day Network website, "What is a Green Job?" by Marge Goodman.

Students will participate in varied activities in order to be introduced to many different "green jobs" in order to create interest in green careers.

Standards of Learning Objectives:

Science—4.4-4.5 4.9, 5.1, 5.3, 5.7, 6.1, 6.3, 6.5, 6.6, 6.9, LS.4, LS.6, LS.11

Technology-- C/T 3-5.1-- C/T 3-5.8

English—5.1, 6.1, 7.1, 8.1

Civic—CE.4g, CE.14

Methods and Activities:

Introduction: Each student will receive one card that will have either a green job title or description. Students will then be asked to find their match pairing up job titles with descriptions. Once students have found their match each pair will be asked to read their cards and share their information. After all pairs have finished, students will be told these are all examples "green jobs". Students will be asked what other green jobs they have heard of and where these green jobs are.

Students will then go the computer lab and go on the website www.realcoolfutures.com to see how their interests can lead them to a job or career in the green field. They will read a brief summary and watch a short video about the job they have chosen. Then allow students to discuss what careers they read about and how they related to their interests.

Materials/Resources/Partners

Examples of Green Jobs for Game Cards:

Solar panel installer – An individual who installs thin panels consisting of an array of solar cells to generate electricity from the sun.

Recycling plant worker – An individual who reprocesses used or abandoned materials.

Environmental educator – A person who teaches about how natural environments function and how humans can manage their behavior.

Environmental scientist – A scientist who studies human interactions with the environment.

Climatologist – A scientist who examines the meteorology of climates.

Park ranger – A person who protects and preserves parklands.

Green designer – An individual who creates sustainable designs.

Green builder – An individual who develops and builds sustainable and green structures.

Green landscaper – An individual who helps reduce negative impacts that land development may have on land, water, and air.

Wind turbine manufacturer – A person who creates structures used to exploit wind energy.

Organic farmer – A farmer who relies on crop rotation, manure, compost, and biological pest control to produce food free of synthetic material or feed additives.

Hybrid car designer – A person who creates automobiles that use two or more forms of power.

Mass transit operator – A person, who transports a large number of people via bus, train or boat.

Bicycle constructor – A person who builds bicycles.

Green business owner – An individual whose business has little or no negative impact on the global or local environment, society, or economy.

Congressperson – A politician who uses their power and connections to implement environmental protection policies.

Website: www.realcoolfutures.com

Additional Resources:

1. Evans, Matt. A Green Future for You. . 29 Dec. 2011 <http://ase.org/index.php?q=resources/green-future-you-lesson-plan>.
2. Goodman, Marge. What is a Green Job?. . 29 Dec. 2011 <http://edu.earthday.org/sites/default/files/what_is_a_green_job_lesson_plan.pdf>.
3. Michigan Department of Agriculture and Rural Development . Gardening: A Math Adventure. . 29 Dec. 2011 <http://www.michigan.gov/mdard/0,1607,7-125-2961_2971-67123--,00.html>.
4. Virginia Department of Education. What Can We Do? . 29 Dec. 2011 <http://www.doe.virginia.gov/testing/sol/standards_docs/science/index.shtml>.

Partners:

Teachers & Volunteers of L.F. Addington Middle School, Wise, VA 24293

Keep Wise County Beautiful Committee

Town and Country Garden Club

U.S. Forestry Service

VCU VIRGINIA COMMONWEALTH UNIVERSITY Make it real.

green STEM

science + technology + engineering + math

Youth Voice

What

Youth voice refers the inclusion of young people as planners and decision-makers in the development and implementation of Service-Learning projects. According to the K-12 Service-Learning Standards for Quality Practice, "Service-learning provides youth with a strong voice in planning, implementing, and evaluating service-learning experiences with guidance from adults." Ideally, students should be "full partners", generating ideas and making decisions during all phases of the project in an environment that encourages trust and open expression of ideas. Youth voice does not mean that the students have the ultimate power; it means that both students and adults respect the different perspectives, ideas and opinions of all the participants and work together to accomplish their shared goals. Youth voice is one of the most important factors in helping young people master decision-making skills and learn to lead. There are many models for youth voice and certain models may work better in different situations. Some commonly used models are:

- Trainers: well-trained youth design and deliver training
- Planners: young people plan and implement the project at all levels
- Evaluators: young people help plan the evaluation process, develop and implement surveys, conduct interviews and document their findings
- Funder raisers: young people are involved in philanthropy by raising money or resources, developing requests for proposals, reviewing proposals, and identifying the recipients of the funding
- Board members: youth serve on organizational governing bodies, as a full voting member with the same decision making responsibilities as other board members

Youth voice can also be one of the most challenging aspects of Service-Learning. Most adults and students have little or no experience with youth voice and are usually unsure of how to effectively utilize it. Just as adults need practice in allowing youth to lead and direct activities, young people need training and encouragement in expressing their ideas and serving as leaders. Service-Learning projects should include carefully designed activities that nurture youth voice competency for both adults and youth.

This material is based upon work supported by the Corporation for National and Community Service under Learn and Serve America Grant No. 09KSSVA002. Opinions or points of view expressed in this document are those of the authors and do not necessarily reflect the official position of the Corporation or the Learn and Serve America Program.

So What

Properly implemented, youth voice can increase the positive outcomes of Service-Learning. It provides partner organizations with new ideas and energy and with the opportunity to improve its connectedness to and interactions with youth. Service-Learning helps to improve how adults view youth and improves their comfort and competency in working with youth. Benefits for young people include:

- Improved self-esteem
- increased engagement in school
- increased development of life skills including leadership, public-speaking and dependability
- reduced involvement in risky behaviors such as drug use and juvenile delinquency
- stronger commitments to the community
- opportunities to act as agents of social change

Now What

It is important to education everyone, youth, adults and partner organizations, concerning youth voice and to provide training and support to ensure it successful inclusion in the Service-Learning project. Students should be provided with the skills, tools and information that they will need to be successful in their role as leaders in the project. They also need to be confident that they have support and guidance from adult mentors. Clear communication, especially related to expectations, roles, and responsibilities, is essential. Some tips for successfully incorporating youth voice in Service-Learning projects are:

- avoid tokenism – provide opportunities for all of the students to participate and lead during the project
- don't ask youth to participate and then ignore their input
- provide youth with meaningful opportunities and tasks
- be honest and realistic – don’t make commitments that you can’t keep
- create a clear system of accountability and be sure that everyone understands the tasks and responsibilities
- provide young people with information, support, and training they need

Resources:

- http://nylc.org/sites/nylc.org/files/files/Standards_Oct2009-web.pdf
- http://lift.nylc.org/
- http://www.servicelearning.org/filemanager/download/7/YVGuide.pdf
- http://www.servicelearning.org/instant_info/fact_sheets/tribal_facts/youth_voice
- http://www.servicelearning.org/filemanager/download/8312_youth_voice.pdf
- http://www.servicelearning.org/instant_info/fact_sheets/cb_facts/youth_voice