**Soil Solutions**

The 4-H Soil Solutions enrichment curriculum is developed for a third grade audience interested in learning about plants and soils in a fun, interactive way. Aligned to meet the science standard course of study in plant and soils, the lessons draw from current research and knowledge from NC State’s crops, horticulture and soil sciences department. Includes eight lessons covering the following topics: soil properties, soil and water relationships, soil and plant growth, composting, seed germination, pollination and flowers, and plant growth and development. Available for free through your local cooperative extension office. Contact your 4-H or your Agriculture/Horticulture agent for more information. Also visit: [http://www.ces.ncsu.edu/4hplantandsoils/soilsolutions.html](http://www.ces.ncsu.edu/4hplantandsoils/soilsolutions.html)

**Junior Master Gardener** (available through Texas A&M Cooperative Extension at [http://www.jmgkids.us/](http://www.jmgkids.us/))

The Junior Master Gardener Level 1 Teacher/Leader guide: $36.00, also available in Spanish.

Provides teachers with the resources to teach students about the wonderful world of gardening. There are eight chapters with hands-on, novel learning experiences for youth. The curriculum also includes activity pages, worksheets, JMG rhythms, reading passages formatted for standardized tests, and much more. After studying life skills and careers, students may culminate their learning experience with service activities. This JMG curriculum is designed for students in grades 3-5 and is complimented by the JMG Level 1 Junior Master Gardener Handbook ($15.00) Developed by Texas Agricultural Extn. Service, Texas A&M University.

**Golden Ray Level: Wildlife Gardener** Grades 3-5 (2005) $33.00

The National Wildlife Federation and the Junior Master Gardener program have joined forces to create an engaging learning opportunity for children. This curriculum will help children learn about the habitat needs of wildlife and develop a greater appreciation for the environment. The program culminates in a community service project, as the students develop a site recognized by the NWF as a Certified Schoolyard Habitat. (230 pp.)

**Golden Ray Level: Literature in the Garden** Grades 3-5 (Reprint 2007) $33.00

This curriculum seeks to engage children through powerful garden- and ecology-themed children’s books. It uses six books to inspire learning through outdoor activities, creative expression and open exploration. Dozens of hands-on activities encourage leadership development, individual responsibility, community involvement, and the development of critical thinking skills. (224 pp.)


Children are motivated to eat the fruits of their labor in their study of "Health and Nutrition from the Garden." This imaginative curriculum teaches children that growing and eating nutritious fruits and vegetables is rewarding and fun. This teacher/leader guide has six learning concepts, with activity pages for children and program information for leaders.

**Level 2: Operation Thistle--Seeds of Despair** Grades 6-8 (2005) $33.00

This level 2 curriculum for the Junior Master Gardener program combines the teacher/leader guide with reproducible pages for young participants. Through dozens of exciting and fun activities, students can investigate plant growth and development, take part in service learning projects, and earn certification--all while undertaking an urgent mission to defeat Dr. Thistle! (204 pp.)

**Level 2: Operation W.A.T.E.R.--Dr. Thistle Goes Underground** Grades 6-8 (2007) $33.00

While following the continuing saga of the evil Dr. Thistle and his plot to rule the earth’s ecosystems, students in grades 6-8 can learn important lessons on soils and water. Topics in this book include soil color, texture and structure; soil nutrients; soil improvement; soil conservation; the water cycle; aquifers, watersheds and wetlands; water movement; and water conservation. Each of the eight chapters contains three hands-on activities to reinforce the concepts covered. Also included is a section on service learning and career exploration projects connected to soil and water. (212 pp.)

The following titles; **4-H Gardening, Discovering Plants, Down to Earth and Eco-Wonders**, are available through the 4-H Curriculum Shop @ [http://www.nc4h.org/publications/curriculum/](http://www.nc4h.org/publications/curriculum/) (you must purchase through your NC 4-H office to receive discounted price.)

**4-H Gardening** (Grades 3–12)

Youth who like to work outdoors and get their hands dirty, plant seeds and watch them grow, will enjoy this series. Developed by Purdue
A – See Them Sprout: Ages 9-10 $3.95
Youth learn to plan a garden as well as plant the seeds, use garden tools safely and harvest crops. Youth autograph pumpkins, grow plants from roots, make a rain gauge and roast pumpkin seeds. (44 pages)

B – Let’s Get Growing: Ages 11-12 $3.95
Youth use transplants in a garden, start seeds indoors, observe how plants respond to light and grow new plants from plant parts. They make a worm box, freeze vegetables and make a compost pile. (44 pages)

C – Take Your Pick: Ages 13-15 $4.40
Youth learn to test and improve soil, extend the growing season, cross-pollinate flowers and assist others in garden projects. Youth also explore photosynthesis, plant, harvest, and dry herbs, and learn to pickle vegetables. (56 pages)

D – Growing Profits: Ages 16-19 $4.40
Youth explore double crop planting methods, the effects of pollution on plants, plant genetics, pest management and starting a plant business. Youth learn how to construct raised beds for planting, investigate hydroponics and spuds in space. (60 pages)

Gardening Helper’s Guide $4.75
This guide provides the helper with activities, ideas and content to help support youth growth and learning in a caring and supportive environment. Included are easy-to-use reference tables and group activities. (108 pages)

4-H Discovering Plants: (Ages 10-11) $2.50, also available in Spanish
This curriculum is for the youth who are future botanists, landscape designers, greenhouse owners, or home gardeners. Youth can learn to measure the girth, crown, and height of trees, how to identify a tree by the leaf pattern, how to landscape a yard, grow herbs, and which parts of plants are edible. Some fun experiments are how light affects the growth of plants, the four ways to propagate plants and fun activities—leaf printing, roasting sunflower seeds, germinating seeds, making dill vinegar and herb sachets.

Leader’s Guide: $1.50
This manual offers suggestions to assist the helper in meeting the needs of youth as they apply what they are learning to the life skills of critical thinking, learning to learn, communication, and planning and organizing.

Down-to-Earth – Gardening in the Classroom $10.00 Grades 4–6
Down-to-Earth assists the helper in using gardening as a means to explore plant growth and development. Through this hands-on, minds-on program, youth learn the basics of botany, the gist of gardening, the essentials of ecology and much more. Through gardening, youth stimulate their senses and cultivate science process and life skills. By gathering data via the scientific method, youth feel a sense of pride and responsibility. This award-winning 88-page activity guide is an excellent resource for school enrichment programs, organized 4-H clubs, school-age child care educators, after-school programs, nature centers, summer youth camps, scouts and traditional school settings. Developed by North Carolina A & T University. (144 pages)

4-H Exploring Your Environment (Grades 3-12)
Youth experience the challenge and excitement of exploring the ecology, science, and technology of the environment.

1 – Eco-Wonders $4.25
Youth experience the four elements of life, connections among living things and how all plants and animals are affected. (60 pages)

2 – Eco-Adventures $4.25
Youth engage in encouraging and challenging outdoor activities. (68 pages)

3 – Eco-Actions $4.25
Youth develop scientific thinking and processing skills in relationship to basic ecological concepts. (68 pages)

Exploring Your Environment Helper’s Guide $4.25
Useful information and activities for helpers to plan, manage and teach an environmental education program are the mainstays of this guide. (60 pages)

Set of 4 PC-07708 $16.00
4-H Acres of Adventure (Grades 3–5)
Introduce young people to the world of agriculture and life sciences while expanding your collection of fun-filled after-school science activities keyed to national standards. Uniquely themed guide containing 40 hands-on lessons developed in cooperation with curriculum specialists from the National Consortium of State Agriculture in the Classroom programs, Extension 4-H professionals and experts from the field of child-care education. It was designed to increase agricultural literacy among 3rd through 5th grade audiences while developing their understanding, appreciation and application of science through a variety of agriculturally-based activities.

Acres of Adventures 1 $7.50
Adults and older youth will enjoy using these lesson plans to quickly engage youth in learn-by-doing agriculture activities within the following thematic units: Plant Detectives, Mystery Agriculture, All about Agriculture, Fast Food Agriculture. (100 pages)

Acres of Adventures 2 $7.50
This group activity guide for the after school teacher provides ready to use lesson plans that will quickly involve youth in experiential activities related to the following thematic units: Insect Invasion, Farm Physics, Agriculture Gone Wild, Frontier Living. (100 pages)

Set of 2 PC-08332 $14.50

4-H Growing in the Garden (Grades K-3)
K-3 curriculum that grows curiosity about agriculture, natural resources, food and people. From Iowa State. 2000. Teachers and students are having fun teaching and learning-by-doing these classroom lessons. Standards and benchmarks were used to create more than 40 kindergarten through third grade science, social studies, language arts, history, math, music, and art lessons. The lessons and four outdoor classroom plans help students develop important life skills such as communication, critical thinking, responsibility, learning to learn, and healthy lifestyle choices. Teachers report that these lessons fit into existing lesson plans, the format is easy to follow, and the materials are readily available. More than 16 pages of resources are listed in the appendix. Order through Iowa State Extension at: http://www.extension.iastate.edu/GrowingintheGarden/, Curriculum $49.50, Leaders Guide, $49.50

Garden Mosaics
Garden Mosaics is a program designed for youth and their adult leaders that combines intergenerational mentoring, community action, and understanding different cultures. Youth learn from elder community members, who share their gardening practices, cultural backgrounds, and wisdom about their community. Youth also learn from the Garden Mosaics educational resources and activities. Activities take place in community gardens, neighborhoods, home and school gardens, and indoors. Youth participants are from community centers, camps, home schools, classrooms, and science enrichment, job skills training, intergenerational, service-learning, and environmental education programs. Developed by Cornell University. For more information visit: http://www.gardenmosaics.org. Garden Mosaics Kit (includes program manual, DVD, poster, etc), $79.98 or Program Manual, $19.99

Roots n’ Shoots
Roots and Shoots is a program started by Dirk and Molly Brown to connect youth with gardening and incorporates intergenerational cooperative learning. They have created two Roots and Shoots garden and developed a curriculum and handbook to help folks get started. This Down to Earth Handbook has everything you will need to know about implementing your own garden program. It is a hands-on, feet-first approach to a school garden where everyone can have a good time learning and working together. This step-by-step guide includes:

• A notebook binder format for easy duplication of materials and addition of your own ideas
• 200+ pages of useful, how-to information, detailed lesson plans for each grade covering natural science, literature, music, art, and math, with templates and samples for class projects and publicity pieces.
• Detailed designs, planting, equipment and structures for each of the seven theme gardens.
• Suggestions for ways to involve school staff, students, volunteers, and community organizations.
• Ways to get started, how to recruit and train volunteers, fund raising strategies, and how to create effective publicity.

To order the handbooks (Volume 1 and Volume 2) at $35 a piece, visit: http://www.rootsnshoots.info/

GrowLab Activities for Growing Minds (Grades k-8)
Whether you’re growing in a greenhouse, in a GrowLab® Indoor Light Garden, or on a windowsill, Activities for Growing Minds will help
spark students’ curiosity about plants and invite them to think and act like scientists. Developed by the National Gardening Association and written and field-tested by educators, this complete curriculum uses fun, illustrated activities to explore plant life cycles, examine plant diversity, and investigate the interdependence of plants, humans, and other living and nonliving things. It’s a must for any plant-based studies! Meets National Science Standards; 307 pages. (1990). Eve Pranis & Joy Cohen, Natl. Gardening Assoc. $24.95

**GrowLab: A Complete Guide to Gardening in the Classroom**

You’ll find everything you and your students need to know about indoor gardening in this comprehensive book by the National Gardening Association. From planning and planting an indoor garden to tackling pests and other challenges, this well-written, easy-to-follow resource will guide you to growing success. Highlights include: Setting up an indoor garden, planning and planting, choosing vegetables, herbs, and flowers to grow indoors, maintaining a healthy growing environment, tackling pests and other problems, conducting special gardening projects. 112 pages. $19.95. Available from the National Gardening Association. [http://www.kidsgardeningstore.com/](http://www.kidsgardeningstore.com/)

**The Growing Classroom**

Developed by the Life Lab Science Program, this award-winning second edition has been revised to meet current science standards. A wonderful collection of classic garden activities, *The Growing Classroom* is a teacher’s manual featuring step-by-step instructions and strategies for setting up a garden-based science program and outdoor classroom activities. Topics include planning a garden laboratory, facilitating investigative lessons on ecology and nutrition, and involving the community. Includes an expanded gardening resource section. This curriculum is a teacher and NGA staff favorite! 464 pages; gr 2-6. $39.95 at [http://www.gardeningwithkids.org/11-4017.html](http://www.gardeningwithkids.org/11-4017.html)

**Soil Science** (Grade 2-3)


**Soil and Life** (Grades 6-12)

This resource and activity book, written by Dr. Robert Ridky for the American Geologic Institute, contains 6 lessons and 23 activities on topics such as physical and chemical weathering, components of soil, water porosity and permeability, land use, and more. Written to the National Science Education Standards, each lesson contains a clear objective and background information on science content and an instructional approach. Activities are hands-on and incorporate questions that promote critical thinking. Most activities can be completed with simple classroom equipment and supplies. Binder includes separately bound teacher’s guide and reproducible, loose-leaf student activity sheets. (2003). Available through Carolina Biological Supply at [www.carolina.com](http://www.carolina.com). $44.50

**Food, Land and People Resources for Learning** (Grades k-12) 2003, revised edition. Available (usually free) through the North Carolina Soil and Water Conservation Division through participation in training workshops. FLP is a Pre-K to 12 curriculum designed to help people understand the interrelationships among agriculture, the environment, and people of the world. The curriculum consists of 55 hands-on lessons, with subjects ranging from environmental science and stewardship to human populations and land use issues. Contact Sandra Weitzel, Div. of Soil and Water Conservation, Raleigh Regional Office, 1628 MSC, Raleigh NC 27699-1628 (919)-791-4200, sandra.weitzel@ncmail.net

**Ag in the Classroom**

Sponsored by the North Carolina Farm Bureau, its goal is to help students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies. Contact: Ms. Louise Lamm, North Carolina Farm Bureau AITC; P.O. Box 27766, Raleigh, NC 27611 (919) 783-4319, louse.lamm@ncfb.org.

**Farm to Table and Beyond**

In this inquiry-based curriculum, students learn about our complex and highly technological global food system and how the parts of this system interact and influence each other — critical ideas in science. Children explore and analyze their personal food choices through scientific reasoning, and they apply what they’ve learned through discussions and debates to personal decisions related to food systems, health, and the natural environment. Developed by educators at Teachers College, Columbia University, *Farm to Table & Beyond* is the second module in the Linking Food and the Environment (LiFE) curriculum series. Includes teacher lesson plans, background information,
teaching tips, and tools for assessment; student activity sheets and readings; and a matrix mapping the book to National Science Education Standards and Benchmarks for Science Literacy. Grades 5-6, 432 pages. $39.95 at http://www.gardeningwithkids.org/11-3310.html

Growing Food
In this inquiry-based curriculum, you and your students embark on an exciting adventure — learning science through the study of our fascinating food production system. Students learn about cycles in nature, flow of energy, and food systems while engaging in hands-on investigations of photosynthesis, food webs, agriculture, and more. Developed by educators at Teachers College, Columbia University, Growing Food is the first module in the Linking Food and the Environment (LiFE) curriculum series. Includes teacher lesson plans, background information, teaching tips, and tools for assessment; student activity sheets and readings; and a matrix mapping the book to National Science Education Standards and Benchmarks for Science Literacy. Grades 4-6, 256 pages. $34.95, available at http://www.gardeningwithkids.org/11-3300.html

Nourishing Choices
Drawing on a wealth of collective experience, Nourishing Choices offers a roadmap for developing a food education program while exciting children about healthful eating. This new book from the National Gardening Association features details on ensuring sustainability, and profiles of model school- and district-based initiatives of all sizes and “flavors.” It also outlines novel and systematic strategies for developing food education programs, from schoolyard gardens and classroom cooking lessons to districtwide farm-to-cafeteria programs that bring local produce to the lunch line. 88 pages. $21.95, available through http://www.gardeningwithkids.org/11-3410.html

Got Dirt? and Got Veggies?
Got Veggies? is a garden-based nutrition education curriculum created with the goal of getting children to eat more fresh fruits and vegetables. Got Veggies? features seven full lesson plans that are aligned with Wisconsin’s Model Academic Standards for Nutrition, Health, Science, and other related subjects. A series of shorter garden-based activities are also included, as well as fun recipes and helpful tips for cooking and eating in the garden. This curriculum provides an all around great way to nurture students’ interest in growing and eating fresh fruits and vegetables!
Got Veggies: http://www.dhs.wisconsin.gov/health/physicalactivity/gotveggies.htm

The Food Project
Amazing program initiated in Massachusetts, connecting youth to growing food in sustainable ways. Their goal is to create fertile ground for new ideas about youth and adults partnering to create social change through sustainable agriculture. A series of publications that range from the logistics of setting up a youth farm and managing a program, to developing a farm market stand as well as activities books for youth development. Visit www.thefoodproject.org for more information and to order books.

• Growing Together: A Guide to Building Inspired, Diverse and Productive Youth Communities, Gale, G.

Program Manuals:
• Academic Year Program Manual
• Rural Agriculture Manual
• Summer Youth Program Manuals, Vol. I, II, & III
• Farmer’s Market Manual
• Urban Agriculture Manual
• Volunteer Manual

National Junior Horticultural Association (NJHA) Study Manual: This manual is strictly horticultural information. Youth can attend a national convention and participate in a horticulture contest consisting of plant identification, knowledge test and judging. There are also opportunities to compete in essay contests, photography and projects for children ages 5-14 in a program called Young America. Each state has an NJHA coordinator. Visit their site at: http://www.njha.org/

• North Carolina State NJHA Coordinator:
  Liz Driscoll, NC State University, 218 Kilgore Hall, Box 7609; Raleigh, NC 27695; 919.513.7346; liz_driscoll@ncsu.edu
Math in the Garden (ages 5-13),
Math in the Garden uses a mathematical lens to explore the magical arena of gardens. Colorful watercolor illustrations depict children, youth and adults discovering patterns, measuring crops, tasting new fruits and vegetables, planting in circles, and graphing their observations of fruits, flowers and shadows. The University of California Botanical Garden, in collaboration with the Lawrence Hall of Science, has developed engaging math activities that anyone can do. Designed to promote inquiry, language arts and nutrition, the activities are grouped by the predominant mathematics strands and support the National Council of Teachers of Mathematics (NCTM) Principals and Standards of School Mathematics and the National Academy of Sciences National Standards for Science Education. 2006. National Gardening Association. $29.95, http://www.gardeningwithkids.org/11-3111.html

Teaching Green: The Middle Years (Grades 6-8)
Teaching Green – The Middle Years was designed to serve as a complete “green” teaching resource for those working with middle school-aged youth, inside or outside of schools. Readers will find a wealth of kid-tested ideas contributed by educators from across North America and covering a wide spectrum of environmental topics, from biodiversity to resource consumption to green technology. They include practical projects and new learning strategies that will inspire educators seeking innovative ideas for incorporating green themes into their programs. Grant, Tim and Gail Littlejohn (eds.) 2004. New Society Publishers, $22.95; http://www.greenteacher.com/middlebook.html

Misc. Curriculum
Horticulture (Grades 4-5)
From Virginia Cooperative Extension are six free downloadable lessons on horticulture, from peanuts, to sweet potatoes to pollination. http://www.ext.vt.edu/resources/4h/4hpubs/pdfs/388-804.pdf

Also from Virginia Cooperative Extension:

Radishes to Riches: A Produce Marketing Project for Youth

Many other great resources from Cornell: http://www.hort.cornell.edu/gbl/pubs/index.html

Vegetable Gardening
From University of Kentucky a vegetable gardening guide for youth: http://www.ca.uky.edu/agc/pubs/4bc/4bc07pa/4bc07pa.pdf

Books with Gardening Activities
Creating Youth and School Gardens


Matthews, Clare. 2005. Great Gardens for Kids, Hamlyn


Sowing the Seeds of Success, 1999, Marcia Eames-Sheavly & National Gardening Assoc

Steps to a Bountiful Kids’ Garden, 2001, National Gardening Assoc.

Subject Books (Misc.)


Bartholomew, Mel. 2006. All New Square Foot Gardening, Cool Springs Press