

# ART TO ZOO

News for Schools from the Smithsonian Institution, Office of Elementary and Secondary Education, Washington, D.C. 20560

March/April 1983

## The Children Raised Kale: A Story of Growing . . . and Growing . . . from Seed to Maturity

Last spring, Zora Felton of the Smithsonian's Anacostia Neighborhood Museum embarked upon a project that grew . . . and grew . . . and grew. The project was a garden, planted and tended by elementary school children in a vacant lot next door to the Museum. The children raised kale and broccoli, potatoes, petunias, marigolds, and tomatoes—from seed to maturity—while gaining experience in such basic science skills as observation, identification, classification, and description. They also learned about the parts of plants and how plants grow. And they enjoyed the satisfaction of actually seeing, *and tasting*, the results of their horticultural labors.

Now *you* can—in your school classroom and nearby community—provide a similar down-to-earth experience for your students. Although the children will not, according to our lesson plan, actually plant and harvest an outdoor garden, they will have the opportunity to grow some plants of their own and learn basically the same skills and concepts as the Anacostia students did. But before we begin our lesson, here, for you to familiarize yourself with, are some essential “gardening facts.”

### Gardening Facts

**What a Garden Is.** A garden is a plot of land where flowers, vegetables, or herbs (often shrubs and trees as well) are planted and cared for. Gardens are grown all over the world: in deserts and rainforests, on seacoasts and mountaintops, and many places in between—wherever there are people to enjoy them. In size, a garden may be as small as a tabletop or as big as a football stadium, and even much bigger.

The very biggest gardens in this country are usually “public,” including botanical gardens, arboretums, and parks, where you often can see a wide variety of plants grown under the very best conditions. In botanical gardens and arboretums (which have as their purpose public education and scientific research), the plants are generally labeled so that visitors can learn to identify them. The difference between botanical gardens and arboretums is this: botanical gardens usually grow all kinds of plants (both woody and nonwoody), whereas arboretums tend to specialize in shrubs and trees. Also, unlike arboretums, botanical gardens often have elaborate greenhouses, where many species of plants—including exotic ones from the tropics—are exhibited year round. Parks, for their part, serve a recreational function for visitors. This is why many parks have picnic benches, playground equipment, and running paths in addition to plantings. The smaller gardens we see everyday are usually “private”—that is, owned and cared for by an individual or a family. Some private gardens grow only vegetables; others grow only flowers; still others, like the one at the Anacostia Neighborhood Museum, grow both vegetables and flowers in the same space.

**The History of Gardens.** Although nobody knows for sure when the world's first garden was planted, we do know that the art and the science of gardening go back for many thousands of years. Soon after people stopped living as nomadic hunters and began to settle down in permanent homes and villages, they started cultivating plants for beauty and food. The ancient Chinese were avid gardeners as were the Persians, the Greeks, the Assyrians, and the Romans. And right down through the ages and up until today, the garden has persisted as



At the Anacostia Neighborhood Museum, Zora Felton and students admire a tomato they have grown.

an important part of our cultural heritage. For the essential truth still remains that even the smallest garden in the heart of the city can help us make that vital connection between the human and the natural worlds.

Over the years, there have been changing styles in gardens just as there have been changing styles in architecture and clothing; and garden styles have also varied from one part of the world to another. This is because gardens, to a large degree, reflect the values and attitudes of the people who create them. Nelson Adams' article on “formal” and “natural” gardens (*see* page three of this issue of *Art to Zoo*) should help you see how this is so.

### The Parts and Kinds of Seed-Bearing Garden Plants

Scientifically speaking, the entire plant kingdom is divided into two enormous groups. These groups are the SEED-BEARING and the SPORE-BEARING plants. Seed-bearing plants include trees, flowers, and most vegetables. Spore-bearing plants include ferns, mushrooms, and mosses. The fundamental difference between these two groups of plants lies in the way they reproduce: (1) by seeds (*as you will see below*), in the case of the seed-bearers, and (2) by primitive, usually one-celled, bodies called “spores,” in the case of the spore-bearers. Although many gardens contain ferns and other spore-bearers, we shall confine our particular discussion of garden plants strictly to the far more prevalent of the two groups: the SEED-BEARERS.

**Six Basic Plant Parts.** All seed-bearing plants, from the tallest trees to the tiniest flowers, have these six parts:

- **Roots**, under the ground, serve to anchor the plant. Roots also take in and store the nourishment that the plant needs to live.

- **Stems** support the branches, leaves, and flowers of the plant and act as a “pipeline” to carry food materials up and down the plant.

- **Leaves**, which may grow from either the stem or the base of the plant, serve to catch sunlight and carbon dioxide from the atmosphere, which act on a green coloring matter called *chlorophyll* to make the starch and sugar that feed the plant.

- **Flowers** are the reproductive organs of the plant. Some seed-bearing plants, like lilies and roses, have flowers that are big and showy. Other seed-bearers, like maple trees and holly bushes, have flowers that are barely noticeable. But all seed-bearing plants *do have flowers* of one sort or another, no matter how inconspicuous they may be. Some of these flowers have male sex organs; others have female sex organs; still others have *both* male and female sex organs. The female sex organ (or *pistil*) of a flower contains a tiny *embryo*; the male sex organ (or *stamen*) is covered with a powdery yellow substance called *pollen*. Pollen may be carried from a male flower to a female flower by certain insects (such as bees) or by the wind. The pollen falls down the pistil of the flower and combines with the embryo, resulting in *fertilization*.

- **Fruits** and seeds are the products of fertilization. When fertilized with pollen, the embryo inside the flower becomes a seed . . . and the pistil of the flower matures into a fruit, which provides protection and nourishment for the seed. The seeds of a plant are extremely precious, for indeed, the whole purpose of a flower is to produce many seeds, which will eventually produce new plants.

*continued on page two*

**Kinds (or Categories) of Seed-bearing Plants.** The enormous variety of plants grown in gardens may be categorized in any number of ways; however, there are certain ways that might be most useful for your students to know about. These are as follows:

flowers versus vegetables and herbs
annuals versus perennials and bulbs
woody versus nonwoody species

When used to define a type of plant, the term "flower" means a plant grown especially for its blossoms, whereas the term "vegetable" means a plant grown especially for a particular part that people like to eat (such as the root in the case of a carrot), and the term "herb" means a plant grown especially for its medicinal, savory, or aromatic qualities. Furthermore, as we've already seen, all seed-bearing plants—including flowers, vegetables, trees, shrubs, and herbs—have parts called "flowers."

The terms "annual" and "perennial" refer to the life-span of a plant. An annual is a plant that completes its entire life cycle in just one growing season: a seed is planted and sprouts up, the plant grows to maturity, flowers, produces seeds of its own, and dies, all in the space of a single year. Because annuals live for such a short time, they must put forth many seeds in order for their species to survive in the long run; and in order to manufacture a lot of seeds, they must produce a lot of flowers. Therefore, most annuals tend to bloom . . . and bloom . . . and bloom, throughout the growing season. "Perennials," on the other hand, which live for three years or more, can afford to produce fewer seeds in order to survive in the long run and therefore have a much shorter growing season than do annuals. You generally can count on a perennial's coming up every year and blooming for several weeks in the spring, summer, or fall. "Bulbs," in a class of their own, are like perennials in that they will come up every year if left in the ground through the winter. The special thing about a bulb, however, is a fleshy underground part of its stem (also called a "bulb") which stores food in the winter and protects the plant that has formed inside it.

The terms "woody" and "nonwoody" refer to the persistence of a plant's stems and branches. "Woody" plants (including trees, shrubs, and some vines) have stems and branches made from tough, hard tissue, which lives on and on from year to year, including the winter, when the plant may be dormant. "Nonwoody" plants, on the other hand, never develop this persistent woody tissue. Instead the stems and branches of the nonwoody plant die back in the winter, even when (as in the case of a bulb or a perennial) the root of the plant remains alive.

**Laying the Groundwork: Environmental Factors to Consider in Planning a Garden**

All seed-bearing plants have three basic requirements for successful growth: water, sunlight, and nutrients in the soil.

The degree to which these three things are needed by a plant varies, however, from species to species. Some plants need a lot of sunlight, whereas others do best in the shade. Some plants need water almost every day throughout the growing season, whereas others can go for weeks at a time without a single drop of rain. Some plants need a heavy concentration of soil nutrients, whereas others do best in a much "poorer" soil.

Because of these wide variations, it is absolutely essential in planning a garden to consider first the environmental conditions where you live—and then to determine which plants will do well naturally in your region. Although nearly everybody knows that cactuses will not grow in a swamp and that marsh grass will not thrive on the desert, the environmental requirements of



Tending the garden at the Anacostia Neighborhood Museum was sometimes a lot of work.

many other plants are every bit as critical, although much less obvious. Gardening books, seed catalogs, and even the backs of seed packets have useful information as to what will do well where.

Then once you have decided which plants will thrive in your particular part of the country, you need to consider the exact site of the garden you are planning. Whether the garden is to be located in a high and dry spot or a low and marshy spot and how many hours of sunlight it will receive each day will also determine your choice of plantings.

Soil is another factor to consider in selecting plant stock for your garden. Even so, you do have some flexibility here, for the quality of garden soil can always be improved upon to suit your particular gardening needs better.

Soil consists usually of tiny rock particles in various stages of weathering, mixed with a quantity of decayed leaves or other organic matter (called humus). The soil characteristics having the greatest bearing on plant growth are three:

- **Texture**—which determines how fast the water drains away. Soil that is too "light" (sandy) will not hold moisture and fertilizer. Soil that is too "heavy" (clayey) will not allow moisture or air to penetrate it, inhibiting the growth of plant roots. The texture of soil can be improved by adding things like leaf mold or peat moss.
- **Fertility**—which means the degree of concentration of soil nutrients. Most garden soils need to have nutrients added every year. Three chemical elements—*nitrogen* (which makes plants lush and green), *phosphorus* (which stimulates root growth and flowering and gives young plants more energy), and *potassium* (which strengthens plants' stems and helps plants resist diseases and survive cold weather)—are deficient in most gardens. These elements can be found in both organic and chemical fertilizers.
- **Acidity**—which means how "sweet" or "sour" the soil is. On a scale of 0 (very sour) to 14 (very sweet), the pH (acidity) factor should be between 6.0 and 6.8 for most garden plants. Gardeners use lime to sweeten soil and sulfur to make it more sour.

**Developing a Teaching Approach**

Once you have familiarized yourself with all of the information on gardens outlined above, you will be ready to develop a teaching approach in line with your curriculum objectives. The lesson plan that follows—on "The Parts and Kinds of Garden Plants and How They Grow"—is strongly science-oriented; but as an alternative, you might yourself develop an art or social studies lesson on garden design, based on some of the other materials from this issue of *Art to Zoo*.

**LESSON: The Parts and Kinds of Garden Plants and How They Grow**

1. After discussing with your students the *Art to Zoo* material you have read on "what a garden is" and "the history of gardens," give the children a chance to describe briefly some gardens they themselves have seen and admired. Were the gardens public or private? What kinds of plants were grown there? Now make a list on the chalkboard of the kinds (or categories) of garden plants that the children are familiar with. For the time being, this list will probably be limited to:

trees	vegetables	shrubs	flowers
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Next have the children try to define each one of the kinds of plants listed, by thinking of important *visible characteristics* shared by all of the members of that particular plant group. "Trees," for example, are relatively tall and have trunks and branches of wood. "Flowers," for their part, are generally much shorter than trees and sport showy (often colorful) parts called *blossoms*. Both trees and flowers come in many different shapes and sizes and have green parts called *leaves*. Now have the youngsters find pictures in old magazines and seed catalogs of many different examples of trees, shrubs, vegetables, and flowers; and arrange these pictures on the bulletin board in their appropriate categories.

2. Next explain to the children the difference (as outlined in this issue of *Art to Zoo*) between seed-bearing and spore-bearing plants . . . and tell them that all of the garden plants they will now be studying are seed-bearers. Remind them that trees are seed-bearers, as are shrubs, flowers, and vegetables. Then pass around, for the class to examine, some examples of the common plant seeds that the children may recognize; avocado, tomato, orange, and cucumber would make a good selection. Finally, using a flowering potted plant as an example, point out the *six basic parts* of seed-bearing plants, describing the function of each part. Have the children take notes on this discussion for future reference.

3. Now find a suitable garden, public or private, to visit with your class. Preferably this garden will have a variety of plants in bloom at the time of your visit; however, if you live in a cold climate where few things bloom out-of-doors until June, a satisfactory alternative to a garden might be a commercial nursery with a greenhouse. Many commercial nurseries welcome visits from school groups, and some even provide educational leaflets and guided tours.

At any rate, be sure to call your chosen facility at least a week ahead of time to arrange for your visit. And right before you go, remind your students about these two fine points of *garden etiquette*:

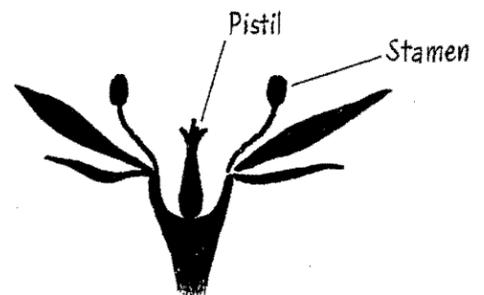
ONE. Stick to the garden paths, avoiding the flower beds.

TWO. Do not pick the flowers, unless invited to by your host!

4. Upon arriving at the garden, give the children a brief introductory tour of the entire facility (if the garden is of a manageable size) or of one or two particular sections (if the garden is very large and divided into several parts). And in the course of this tour, have each student choose—and note down the location of—five different plants that he or she would like to find out more about.

Then on a *worksheet like the one shown here* (with its first column filled in to show how) have each child record the following information for each one of the plants that he or she has selected:

- the overall shape of the plant
- the shape of the flower(s) or buds, if the plant is in bloom or in bud
- the shape of the leaves
- the color of the flowers and of the leaves
- the approximate height of the plant (in centimeters)
- the location of the plant (in full sun, partial sun, or shade).



This is a cross-section diagram of one kind of flower having both male and female parts. Other kinds of flowers with both male and female parts may have the parts arranged differently.

5. Back in your classroom, discuss with students the various categories of seed-bearing plants explained in this issue of *Art to Zoo*, as well as the information presented in the section above on "Environmental Factors to Consider in Planning a Garden." Then have the children use seed catalogs and books such as the *Time/Life* volume *Annuals* (listed in the bibliography at the end of this article) to identify and classify the plants they have documented on their worksheets. In addition to writing down the popular name of the plant, each student should also indicate whether the specimen is a flower, an herb, a tree, a shrub, or a vegetable . . . woody or nonwoody . . . an annual, a perennial, or a bulb. And the children should also describe the *specific environmental conditions* that each of the plants needs in order to grow.

**PLANT WORKSHEET**

	#1	#2	#3	#4	#5
Sketch of plant					
Sketch of flower(s) (if present)					
Sketch of leaf					
Color of flowers and of leaves	green leaves yellow flowers				
Approximate height of plant	2' (or 61 centimeters)				
Location of plant (sun or shade)	SUN				

# Two Design Attitudes: Formal and Natural

by NELSON ADAMS

Two major traditions, formal and natural—make up the most important part of our European heritage in park and garden design. And both of these traditions, when you dig below the surface, reflect the values and attitudes of the people who created them. Let's see how this is so.

## Formal Gardens

The development of formal gardens, as private pleasure gardens of the wealthy, began in the Renaissance and carried through into the late 1700s. Gardens of this style were laid out in carefully ordered geometric shapes (especially squares, circles, and ovals), which were embellished over the years to include all sorts of fancy and stylish devices from topiaries to mazes (*see* the illustrations on this page).

One important concept of the formal garden was that of the "vista," or view. Often a garden would be designed so that from a particular vantage point, all the eye would see was ordered, rational, and arranged by the hand of man. All of the elements of nature would be there: trees, flowers, shrubs, and vines, as well as bodies of water with ducks and geese. The design of the vista required the eye to be drawn to some focal point in the distance, perhaps a sculpture, a small building, a topiary, or a fountain, which would provide an endpoint to the view.

Activities in formal gardens included strolling, socializing, and people quietly congratulating themselves on having imposed so much reason and unimpassioned order upon a once unruly (and perhaps unpredictably dangerous) natural world. Here were people, first from the Renaissance and later from the "Age of Reason," absorbed with the idea of controlling the world around them—and this attitude is reflected in all of their creative endeavors, including their gardening.

Formal gardens, too, were means of "conspicuous consumption," providing their owners with a way of impressing their friends and neighbors with their cleverness, taste, and wealth. Today in Europe many formal gardens are open to the public as tourist attractions, often outshining the chateaus and palaces with which they are associated.

## Natural Gardens

By the late 1700s the rigidity and rationalism of the formal garden began to lose favor, and a new style evolved called the natural garden. However, this kind of garden—although, when finished, it looked as if it had just "naturally" happened—wasn't really natural at all! Indeed, it was just as carefully planned and laid out, with this element here and that element there, as the formal garden had ever been.

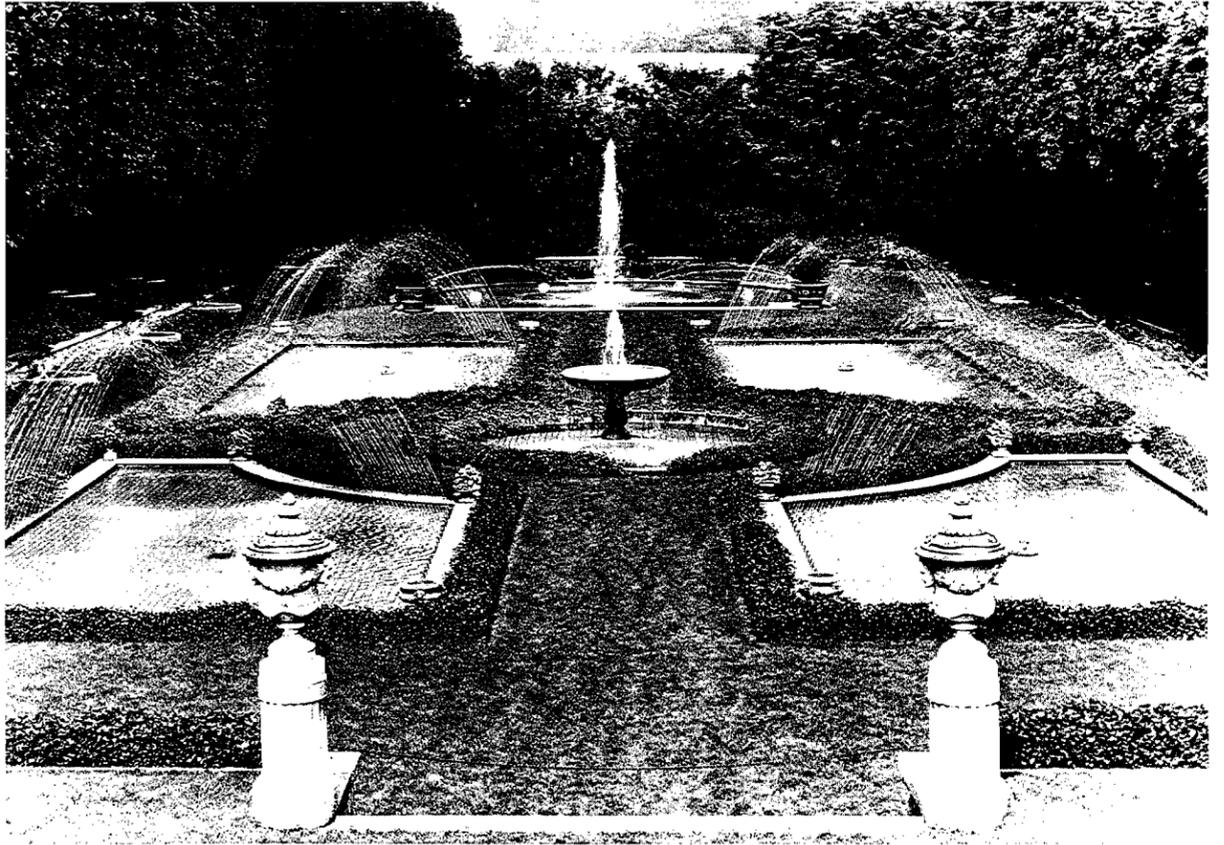
But by now the emphasis had shifted from controlling and organizing nature to *re-creating* it. For example, maybe your garden would consist of rolling hills, a flowing stream, patches of woods with wildflowers nearby, and a quaint wooden bridge over the stream. No matter that you had started, perhaps, with a flat terrain and no stream; you simply could create the required features where nature had neglected to do so!

The beginning of the natural garden movement came somewhat before the Romantic movement in literature and the arts—and you can see the Romantic belief in an idealized nature reflected in the natural garden. The Romantics believed that nature was inherently good, and that man's manipulation of it into artificial forms such as seen in the formal garden could only corrupt and debase it. Another Romantic hallmark of the natural garden was to encourage a wider range of emotional response from people. Natural gardens, with their sun and shade, still and rushing water, open spaces and hidden glens and even counterfeit Roman ruins, reflected the many moods of both nature and man.

## Gardens Today

Even today our gardens and parks reflect these two styles, formal and natural. For example, the National Mall in Washington, D.C., with its monuments and memorials, is basically a two-mile-long formal park, with some adjacent areas planted in a more natural style. Even our small private gardens derive from these two major characteristics in garden design; and in fact, the formal and natural styles seem to set the boundaries and define the terms for all our thinking about gardens large and small.

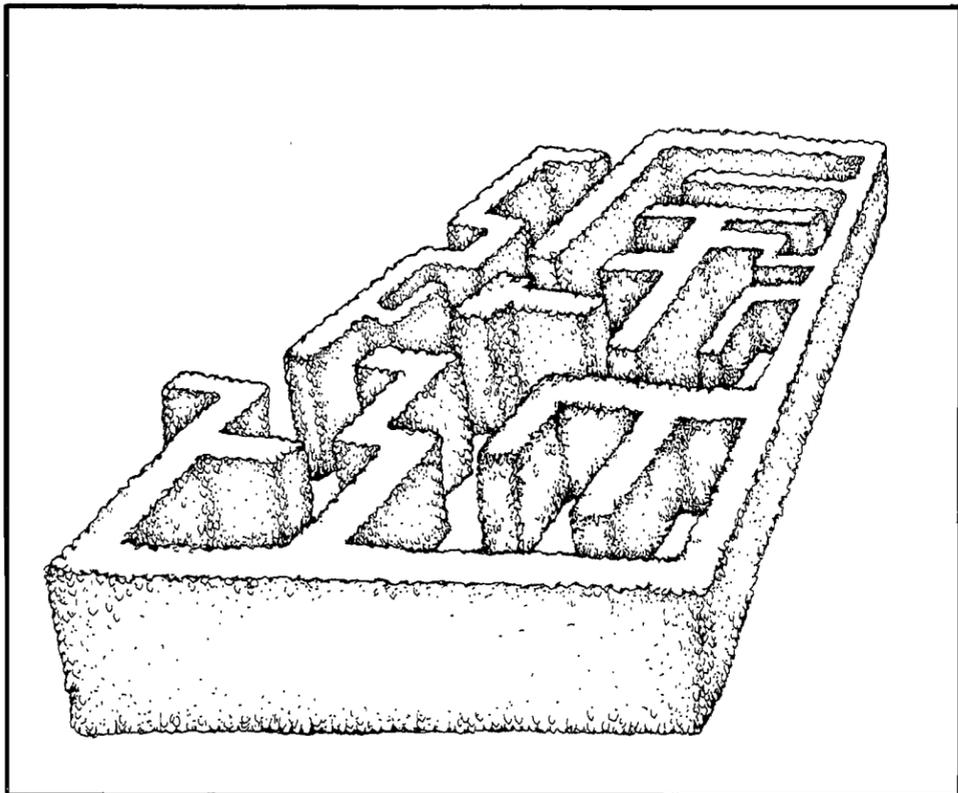
Look around your community for the influences of these two styles, as well as for the many varieties of garden design. What clues can you find—in the choices and preferences you see—to your own and your neighbors' personal values, ideals, and ways of having a good time?



Formal garden at Longwood Gardens, Kennett Square, Pennsylvania.



A topiary is a tree or shrub that has been clipped into a fancy, often whimsical, shape. The topiary horses, riders, and hounds shown in this photograph are from the Ladew Topiary Gardens in Monkton, Maryland.



A maze is a network of garden paths bordered by clipped hedges. The challenge to the garden visitors is to find your way in—and out—of the maze without getting lost.

## ART TO ZOO

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### Regular Contributors:

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THE HIRSHHORN MUSEUM AND SCULPTURE GARDEN  
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THE NATIONAL MUSEUM OF AMERICAN ART and the  
RENWICK GALLERY

THE NATIONAL MUSEUM OF AMERICAN HISTORY

THE NATIONAL MUSEUM OF NATURAL HISTORY

THE NATIONAL PORTRAIT GALLERY

THE NATIONAL ZOOLOGICAL PARK

Smithsonian Institution Press

Designer: Stephen Kraft

Associate Editor: Ruth W. Spiegel

For help with this issue of *Art to Zoo*, we are especially grateful to Lauranne Nash, Chief of the Education Division in the Smithsonian's Office of Horticulture. Good suggestions were also provided by Alan Gartenhaus and Thomas Lowderbaugh of the Office of Elementary and Secondary Education.

*Art to Zoo* brings news from the Smithsonian Institution to teachers of grades three through eight. The purpose is to help you use museums, parks, libraries, zoos, and many other resources within your community to open up learning opportunities for your students.

Our reason for producing a publication dedicated to promoting the use of community resources among students and teachers nationally stems from a fundamental belief, shared by all of us here at the Smithsonian, in the power of objects. Working as we do with a vast collection of national treasures that literally contains the spectrum from "art" to "zoo," we believe that objects (be they works of art, natural history specimens, historical artifacts, or live animals) have a tremendous power to educate. We maintain that it is equally important for students to learn to use objects as research tools as it is for them to learn to use words and numbers—and you can find objects close at hand, by drawing on the resources of your own community.

Our idea, then, in producing *Art to Zoo* is to share with you—and you with us—methods of working with students and objects that Smithsonian education staff members have found successful. This is the second of three issues to be published this school year.

# Smithsonian Offers Summer Course For Teachers

You don't have to live in Washington to study at the Smithsonian!

Using Museums to Teach Writing," a special one-week course, will be offered by the Smithsonian Institution this summer for elementary and secondary school teachers living more than 75 miles outside the Washington, D.C., metropolitan area.

The course is accredited by the University of Virginia. Tuition and materials fees will total approximately \$200. No scholarships are available.

"Using Museums to Teach Writing" will survey ways in which teachers can use local museum exhibits and community resources as tools for teaching writing. In addition to working on formal and informal exercises, participants will interview several Smithsonian Institution staff writers to learn about various approaches to writing.

The course, worth three graduate credits, is open to full-time classroom teachers, grades 5-12, school librarians (media specialists), and curriculum specialists. Interpreters for hearing-impaired individuals can be provided for all class work.

Classes will meet July 5 to 13 in Washington, D.C. Specially priced housing may be available in a conveniently located college dormitory. Participants will arrange their own meals.

Enrollment is limited. Applications must be post-marked no later than April 15. Notices of acceptance will be mailed by April 30.

For an application form, including complete information, write:

National Seminars  
Office of Elementary and Secondary Education  
(OESE)  
Arts and Industries Building, Room 1163  
Smithsonian Institution  
Washington, D.C. 20560  
Or, call 202/357-3049.



Teachers in a recent OESE course on "Using Museums to Teach Writing" document the steps of a spinning demonstration in the museum.

continued from page two

7. Finally, have your students grow their own garden plants. Give each child a small flower pot (or peat pot) and standard potting medium, as well as several plant seeds (preferably from one of the kinds of plants he or she has studied and identified). Have the children plant the seeds and place the pots (each labeled with the name of the child and the name of the plant) all together in a spot where they will have sufficient light to grow once they begin to sprout (say, under a "grow light" or in a sunny window). Have the children water the soil just enough to keep it from drying out. And ask each individual child to keep a record of his or her own plant's growth, including:

- How long it takes the plant to germinate (or sprout).
- How many centimeters (or millimeters) the plant grows each week.
- How long it takes for the buds of the plant to appear (if indeed they do appear before the end of the school year).

As a culminating activity to their study of garden plants, the children might enjoy staging a GARDEN SHOW featuring all their plants and the information they have researched about them. If the plants are not yet blooming, pictures of the blossoms might be pasted to the flower pots to help lend color and give visitors a better idea of what the mature plants will look like. In addition, a supplementary bulletin board exhibit with many color pictures (both drawn by the children and cut from magazines and seed catalogs) on the various categories of plants discussed earlier should be included so as to round out our story on seed-bearing plants and how they grow . . . and grow . . . and grow.

### Garden Resources

#### BOOKS FOR STUDENTS

Brown, Marc. *Your First Garden Book*. Boston: Little Brown, 1981.

Gambino, Robert. *Easy to Grow Vegetables*. New York: Harvey House, 1975.

Mintz, Lorelei Miller. *Vegetables in Patches and Pots: A Child's Guide to Organic Vegetable Gardening*. New York: Farrar, Straus and Giroux. New York: 1976.



At the Anacostia Neighborhood Museum, children and an unidentified parent stop to admire the fruits (as well as the seeds, flowers, stems, leaves, and roots) of their horticultural labors.

Murphy, Louise. *My Garden*. New York: Scribners, 1980.

Paul, Aileen. *Kids Outdoor Gardening*. New York: Doubleday, 1978.

Simon, Seymour. *Projects With Plants: A Science at Work Book*. New York: Franklin Watts, 1973.

#### BOOKS FOR TEACHERS

Berral, Julia S. *The Garden, An Illustrated History*. New York: Viking Press, 1966.

Bush-Brown, James, and Louise Bush-Brown. *America's Garden Book*. New York: Scribners, 1965.

Crockett, James Underwood, and the Editors of Time-Life Books. *Annals: The Time-Life Encyclopedia of Gardening*. Vol I. New York: Time-Life Books, 1971.

Hyams, Edward. *A History of Gardens and Gardening*. New York: Praeger, 1971.

Sunset Books. *Sunset Introduction to Basic Gardening*. Menlo Park, Ca.: Lane Publishing Company, 1981.

Wyman, Donald. *Wyman's Gardening Encyclopedia*. New York: Macmillan, 1974.

#### OTHER RESOURCES

*Education Directory*. American Association of Botanical Gardens and Arboreta, Inc. Lists the various education programs, including tours, workshops, and lectures offered by botanical gardens in the United States and Canada. To order, send \$2.75 to AABGA, Box 206, Swarthmore, PA 19081.

*Gardening Educational Aids*. National 4-H Council. Booklets and slide/tapes for children. For a listing of these and other 4-H materials available to schools, write: National 4-H Council, 7100 Connecticut Avenue, Chevy Chase, MD 20815.

*Reference Aids and Poster*. United States National Arboretum. Bibliographies and list of commercial sources of herbs, as well as colorful poster—all free. Write: U.S. National Arboretum, 3501 New York Avenue, N.E., Washington, D.C. 20002.

*Seed Catalogs*. Available free from many seed companies. Several of the books listed in this resource guide, including *Your First Garden Book* by Marc Brown and *Vegetables in Patches and Pots* by Lorelei Miller Mintz, contain names and addresses of seed companies in different parts of the United States.

# PULL-OUT PAGE



## With **B** **U** **L** **B** **S**, Miracles *Do* Happen!

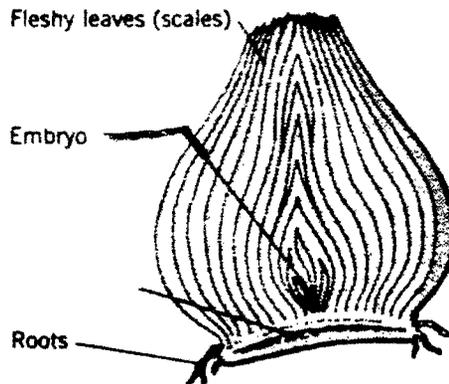
Some plants grow from thickened, underground stems called "bulbs." The onion is one example of this type of plant. In fact, the part of the onion we usually eat is really a bulb. Daffodils, tulips, and crocuses are some of the other plants that grow from bulbs.

Inside their brown or white papery coverings, bulbs are packed with energy and life. Cut a bulb in half from top to bottom, and this is what you'll see: At the very center of the bulb, near the bottom, a tiny plant is forming. This tiny plant is called an *embryo*. Surrounding the embryo are fleshy leaves called *scales*, which protect and store food for the embryo.

When planting a bulb, always place it in the ground with its pointed end up. Then roots will grow down from the bottom of the bulb, and the tiny plant inside the bulb will get bigger and bigger until it eventually sprouts up through the top. In time, as this bulb sprout continues to grow, it will force its way up through the ground. Then after a while, what seems like a miracle will happen. Green leaves will unfurl; blossoms will

form; and your bulb will have made a lovely flowering plant.

See page four of the Pull-Out Page for step-by-step instructions on how to grow a bulb indoors.



*Cross-section of a daffodil bulb*



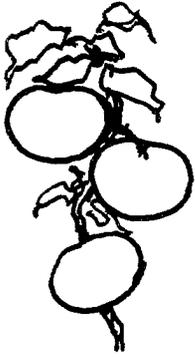
# Matching Game: Products & Plants

Have you ever stopped to think that many of the products (or things) we use every day come from garden plants? First try to identify the plants shown below by writing the name of each one in the space underneath. (To help you out, we've filled in for you the name of the first plant—a tomato.) Now draw a line between each plant and the product that comes from it.

## Answers to matching game:

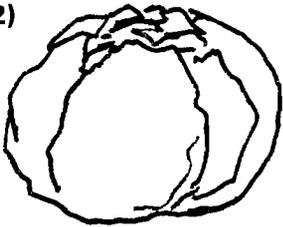
- (e) (5)
- (c) (4)
- (q) (3)
- (a) (2)
- (d) (1)

(1)

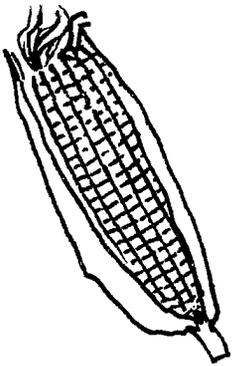


T O M A T O

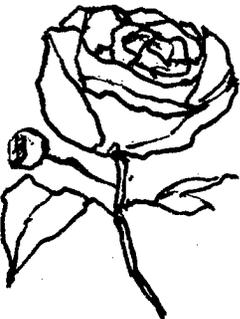
(2)



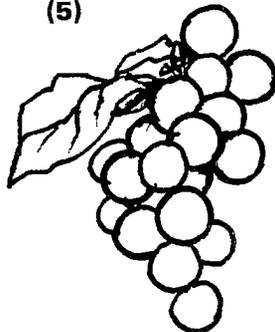
(3)



(4)



(5)



(a)



(b)



(c)



(d)



(e)



# Bring Spring Indoors Anytime with Flowering Bulbs

One perfect way to bring a touch of spring to your life, even in the fall or winter, is to grow a beautiful flower from a bulb right on your own windowsill. A good bulb to start with is the *paperwhite narcissus*, known for its sweet-smelling white blossoms. Here is what you do:

- Buy three or four paperwhite narcissus BULBS from your nearby garden center, drug-store, or hardware store. You'll also need about two cups of PEBBLES OR SAND and a shallow DISH OR BOWL.
- Pour half of the pebbles or sand evenly into the bowl.
- Arrange the bulbs on top of the pebbles or sand, pointed ends up and close together.
- Add more pebbles or sand so as to cover the bulbs just halfway. (The tops of the bulbs should show.)
- Store the dish in a cool, dark place for ten full days. (During this time, the roots of your plants will be forming.)
- Now place the dish in a cool, sunny window. Water it regularly, so as to keep the roots of the bulbs wet. Expect to have flowers in about four weeks.

