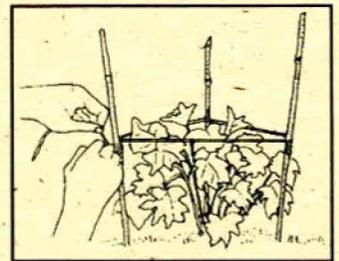
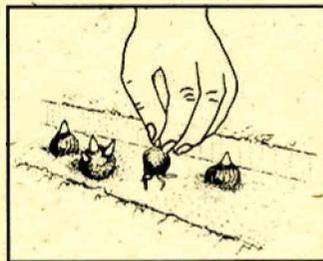
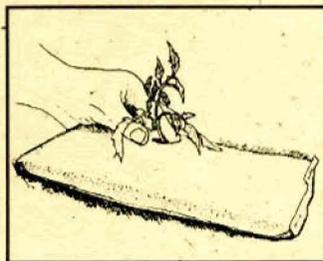
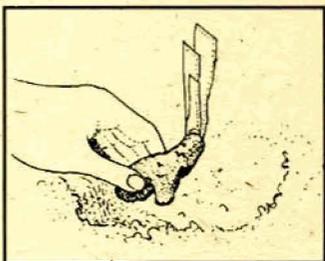


GARDENS OF

Fabulous Flowers

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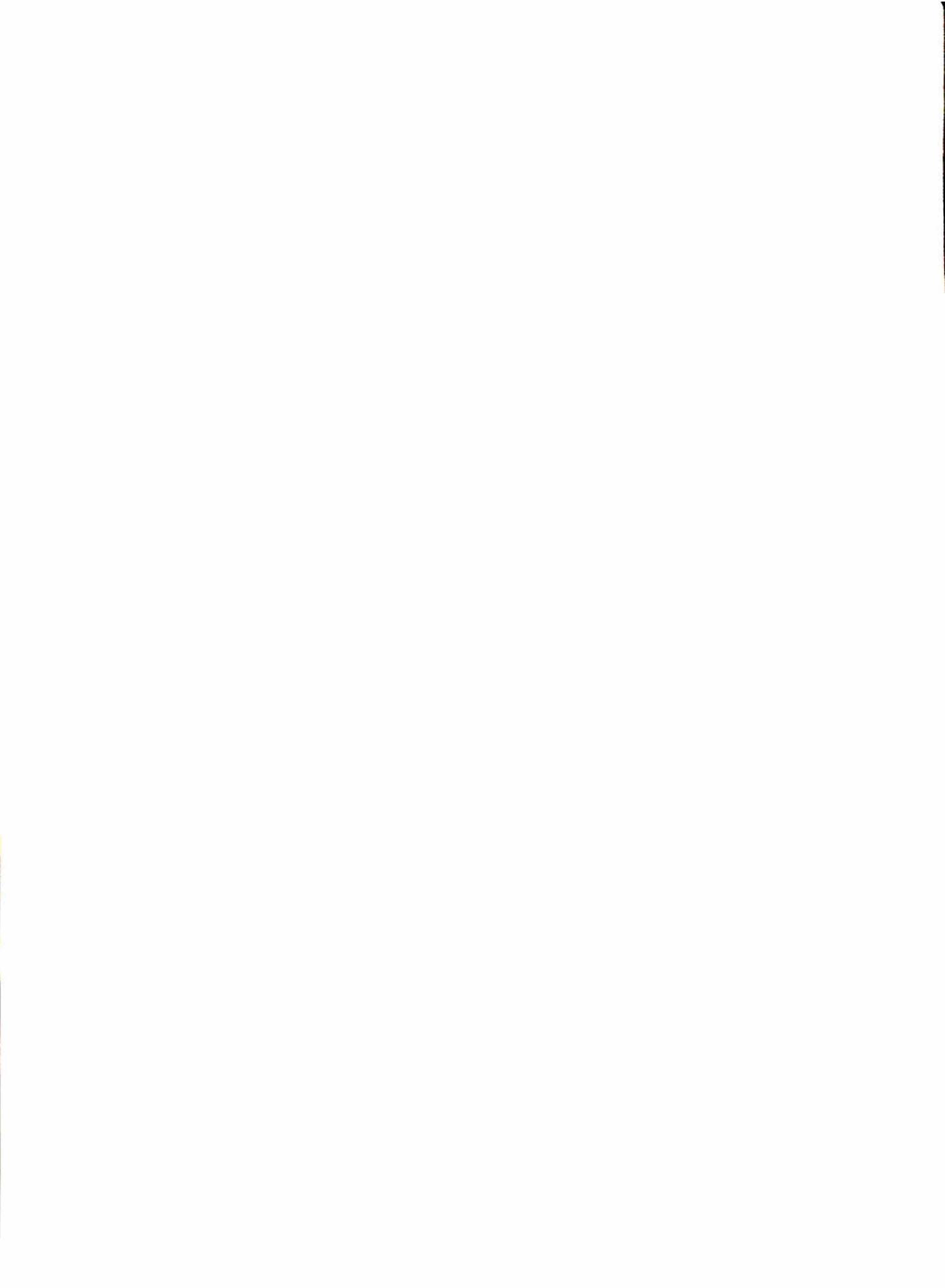


How to Use This Guide

Gardens of Fabulous Flowers is intended for 4-H leaders or for advanced, older 4-H members. The guide is divided into three sections: "Annual Flowers," "Perennial Flowers," and "Spring- and Summer-flowering Bulbs." Each section presents general information on the subject for the leader, followed by one or two lessons to be conducted with group members. Each lesson contains a list of materials, a full description of the activities, and suggestions for simple experiments that extend what members have learned.

Flower gardening is a popular project, which you can begin in late winter by sowing seeds indoors and continue through autumn by planting hardy bulbs. It is not necessary, however, to attempt all three sections (or five lessons) with your youth group in one year. You might consider a three-year sequence, starting with annuals and culminating with bulbs. Those with limited garden space may find annuals or bulbs rewarding. It is usually more satisfying for both young people and leaders to complete a smaller project successfully than to move quickly and haphazardly through a larger project. Where more space is available, a perennial border enhanced with annuals and bulbs makes an interesting project, especially for older youth group members.





Annual Flowers

General Information for Leaders

Some of the most popular garden flowers are the annuals—plants that live for only one year. Many varieties of annuals are colorful and easy to grow. They can be planted in many different areas around your home: along drive-ways, walks, terraces, and fences, or in front of permanent foundation plantings. They add color to your garden if planted among perennial flowers and spring-flowering bulbs, in rock gardens, alongside shrubs, or even in herb gardens. Started plants grow well in window boxes, hanging baskets, urns, containers, and movable tubs. If you have no outdoor gardening space, you can grow flowers on window sills and in window boxes using a “pillow pak” (see p. 11). Annual flowers can be used indoors in fresh and dried arrangements, in corsages, or in potpourri. ☼

Selecting Annuals

The following descriptions of some of the most popular annuals should help you and your group members decide which ones to include in your garden.

Ageratum

Ageratums are grown primarily for their fuzzy clusters of blue, pink, or white flowers above mounds of sturdy green leaves. Plants will tolerate either full sun or light shade, and they therefore represent a valuable addition to the shade garden.

China Aster (Callistephus)

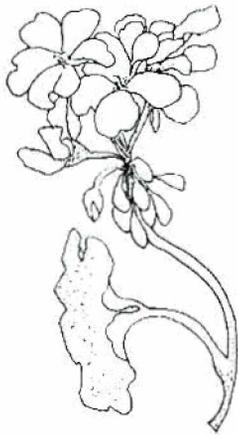
China asters should not be confused with the fall asters, which are perennials. The flowers actually more closely resemble chrysanthemums, and they come in shades from white to yellow, pink, red, purple, and blue. Although China asters can provide an impressive flowering show, they are not without problems. They need mulching to cover their shallow roots, and they are susceptible to both a fungus and a viruslike disease. Nonetheless, their beauty ensures their continuing popularity.

Cockscomb (Celosia)

Celosia flower heads are among the most unusual of any annuals. The ‘Cristata’ types have tops that resemble a rooster’s comb or a brain! The ‘Plumosa’ type’s flower heads look more like an ostrich’s plumes. Both types are available in reds, orange, yellow, and purple. The flower heads are very long-lived and can be dried as everlasting. These plants bloom best in the hot sun.



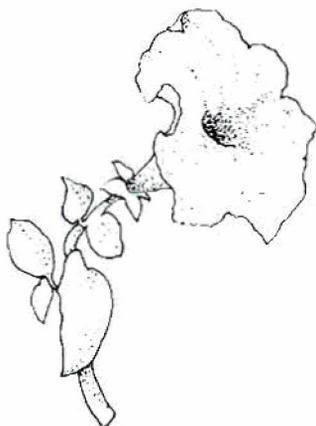
Cockscomb



Geranium



Marigold



Petunia

Coleus

Although still used most frequently as house plants, coleus also provide fascinating foliage contrast in a shady annual bed. The wild, multihued leaves are available in heights ranging from 6 inches to 2 feet. Plants are very easily grown outdoors, as long as adequate water is provided. If plants become leggy, they can be pinched back, and the pinched stem can be rooted as a new plant.

Cornflower, Bachelor's Button (*Centaurea*)

The old-fashioned cornflower will never win an award as the most stunning of all annuals. But it is an easily grown, reliable bloomer that makes a good choice for first-time gardeners. The flowers, which are available in shades of blue, pink, rose, and white, are most profuse when plants are grown in full sun.

Cosmos

The yellow cosmos has blooms that closely resemble those of tickseed. The more common pink- or red-flowered form grows twice as tall, often reaching heights of 5 to 6 feet. Both forms are easily grown in full sun, although the taller plants may need staking.

Gazania

Gazanias, which actually are perennials, are gaining increasing popularity as annuals because of their impressive 4-inch-wide blooms. A packet of seeds or flat of seedlings will typically have plants with flower colors ranging from yellow to gold, pink, red, and bronze. Gazanias like it hot, so provide a full sun location and a very well-drained soil.

Geranium (*Pelargonium*)

Everyone knows geraniums, those tough, durable plants. In addition to upright zonal geraniums, there are also

ivy geraniums, fancy-leaved 'Martha Washington' types, scented geraniums, and uprights grown from seed. The zonal geraniums, which are the most common, grow best in full sun, with infrequent watering. Geraniums can be kept over winter by rooting cuttings or keeping plants on sunny windowsills.

Impatiens

Impatiens are the most popular bedding plant in America. Children find plants easy and reliable to grow, and modern varieties display a tremendous range of colors and are more compact. Although traditional types thrive in light shade, the 'New Guinea' impatiens, with their brightly colored leaves, do equally well in full sun. All impatiens require frequent watering to prevent wilting, and they are sensitive to frost.

Marigold (*Tagetes*)

The wild Mexican marigold has been intensively bred to yield a wide selection of flower types and sizes and overall plant size. There are marigold varieties for any garden setting, from dwarf types to 2-foot tall African hybrids. Grow marigolds in a sunny site, with a well-drained fertile soil. They bloom very reliably.

Petunia

Petunias of one variety or another will almost always show up in young people's gardens. Hybrid varieties flower profusely throughout the season, are available in many colors, and hold up well in the rain. The best-looking plants are grown in full or half-day sun, in a well-drained, loamy soil.

Pot Marigold (*Calendula*)

Pot marigolds self-sow freely, often sending seedlings up in the same area year after year. They are a very easily grown plant, especially in sunny sites

with fertile soil. The yellow, orange, or salmon-colored flowers blend well with true marigolds or can be used as an alternative to them.

Snapdragon (*Antirrhinum*)

Snapdragons are a wonderful choice for young people. Their bright, cheery flowers, available in a wide color range, can be squeezed to make their "dragon mouths" slowly open, then snap closed. Depending on the variety chosen, height will vary from 6 inches to as tall as 3 or 4 feet, allowing great flexibility in where they are placed in the annual border. Grow snapdragons in a well-drained soil in full sun.

Spider Flower (*Cleome*)

Cleomes are fun for kids because plants grow so rapidly, often achieving the height of an average nine-year-old by midsummer. In fact, the long, curved reproductive parts of the flower heads do resemble the legs of a large spider. Cleomes grow best in full sun or light shade, in the back of a flower border. Like pot marigolds, they frequently self-sow seedlings the next season.

Strawflower (*Helichrysum*)

There are a number of wonderful qualities that strawflowers possess: they are available in many flower colors, they are free flowering, and they retain their color and shape nearly perfectly as dried blooms. To dry, cut the flowers just before they fully open, strip off the foliage, and hang the flowers upside down in a dark, cool place.

Sunflower (*Helianthus*)

Rising from a modest history as a common farm weed, modern varieties of sunflower possess spectacular single or double flowers of white, yellow, bronze, and even lavender. True to their name, sunflowers require a bright, sunny

location for best flowering, although they are not fussy regarding soil type. Plant height is from 2 to 4 feet, depending on variety chosen.

Sweet Alyssum (*Lobularia*)

Sweet alyssum is the perfect annual edging plant, to be used along the front of flower beds. The tiny white, pink, or purple flowers form neat heads that merge into solid masses of color. Sweet alyssums tolerate almost any soil and will grow in sun or light shade.

Sweet Pea (*Lathyrus*)

Sweet peas are one of the easiest and most free flowering of any annual vine. Wild sweet peas have light pink flowers, but the blooms on newer hybrids range from red to purple and blue. Grow sweet peas where their roots can be protected from heat and sun. Provide ample amounts of water to encourage rapid growth.

Wax Begonia (*Begonia semperflorens*)

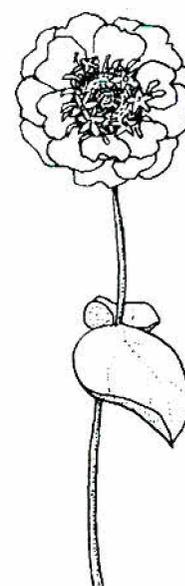
Although a true perennial, wax begonias are grown as annuals in the North because of their free-flowering habit the year they are started. Wax begonias are available in a wide selection of flower colors (red, pink, or white), flower sizes (from single blooms to golf-ball-sized doubles), and leaf colors (glossy green or bronzy red). Plants do well in light shade and a rich, moisture-retaining soil. They are very sensitive to frost.

Zinnia (*Zinnia elegans*)

Zinnia's daisylike flowers are available in single or double forms in virtually all colors but blue. These plants grow best in a hot, dry location. High humidity and plantings with poor air circulation can lead to a disfiguring leaf spot fungus. Otherwise, zinnias are easy to care for, and they make long-lasting cut flowers.



Snapdragon



Zinnia

Buying Seed

Be sure to buy fresh seed. Old seed may have lost vitality, will germinate slowly, and may produce poor seedlings. Keep all seeds cool and dry until you are ready to sow them. Newer varieties, especially those designated as "All America Selections," are likely to have larger or more flowers than older selections. There are many worthy older varieties that are still listed in seed catalogs, however, and these may be less expensive than the newer introductions.

Seeding

Direct seeding—planting seeds directly into the soil where they will grow—is the easiest of all seed-starting methods. It requires little or no tools and equipment. Plants don't suffer transplant shock, and plants started from seed tend to grow a little faster than transplanted seedlings.

After the soil has been properly prepared, start by filling an inch-deep furrow with vermiculite or coarse sand. This will prevent the soil from caking and blocking water movement. Moisten the vermiculite or sand with a fine spray from a garden hose or watering can. Seed directly into the furrow, spacing the seed at the distance directed on the packet. Cover the seed to the recommended depth with more vermiculite or sand.

The following annuals can be seeded outdoors as soon as the soil is workable:

annual phlox (*Phlox drummondii*)
baby's breath (*Gypsophila elegans*)
bachelor's buttons (*Centaurea cyanus*)
Chinese forget-me-not
(*Cynoglossum amabile*)
Iceland poppy (*Papaver nudicale*)
larkspur (*Consolida ambigua*)
love-in-a-mist (*Nigella damascena*)
pot marigold (*Calendula officinalis*)
sweet alyssum (*Lobularia maritima*)
sweet pea (*Lathyrus odorata*)

The annuals listed below can also be started outdoors, but should not have their seed sown until all danger of frost has passed:

calliopsis (*Coreopsis tinctoria*)
candytuft (*Iberis spp.*)
China pink (*Dianthus chinensis*)
cosmos (*Cosmos bipinnatus*)
dwarf morning glory
(*Convolvulus tricolor*)
flowering tobacco (*Nicotiana alba*)
four o'clocks (*Mirabilis jalapa*)
French marigold (*Tagetes patua*)
Madagascar periwinkle
(*Catharanthus roseus*)
morning glory (*Ipomoea spp.*)
nasturtium (*Tropaeolum majus*)
pincushion flower
(*Scabiosa atropurpurea*)
rose moss (*Portulaca grandiflora*)
sunflower (*Helianthus spp.*)
sweet William (*Dianthus barbatus*)

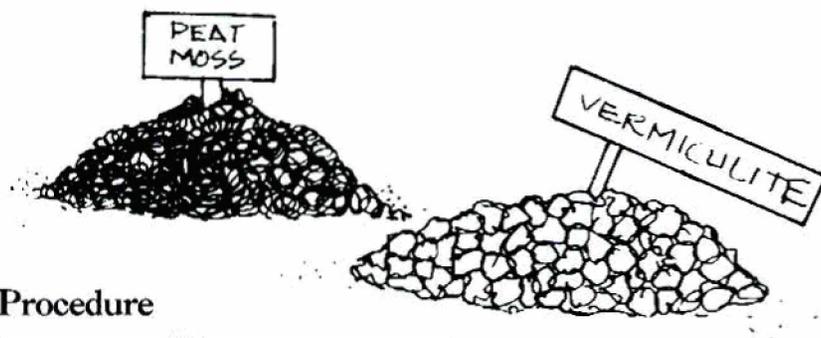
Lesson 1.

Starting Annuals from Seed

Starting annual flowers from seed indoors is a good project for late winter or early spring. This experience will teach youth group members a lot about plants. They will be able to observe the emergence of the seed leaves or cotyledons and relate the response of different seeds and seedlings to the environmental conditions that the members use. Start this lesson about six weeks before it is safe to plant annuals outdoors in your area. 🌸

Materials

- A commercial "peat-lite" or soilless growing mix. Or group members may make one themselves consisting of the following:
 - vermiculite no.2 size (4 quarts)
 - shredded sphagnum peat moss (4 quarts)
 - limestone (1 tablespoon)
 - superphosphate (1 tablespoon)
 - 5-10-5 fertilizer (1 tablespoon)
- Small starting trays of plastic, styro-foam, or compressed peat
- Seeds of annual flowers
- Clear plastic bags
- Cell paks for transplanting



Procedure

Perhaps you or your group members have had bad luck with the soil directly from your gardens. Garden soils are not the best media for sowing seeds indoors because they drain poorly, lack necessary organic matter, and are often infested with diseases or weeds.

Explain to participants that a simple formula can be used to produce a superior medium for growing plants. This "peat-lite" or soilless mix drains well, is high in organic matter, and is relatively sterile (free of diseases and weed seeds).

If members will be mixing their own peat-lite, have them lightly moisten the peat moss with warm water before mixing to reduce dustiness. They should then mix the materials thoroughly on a clean surface. They may use the resultant mix immediately or keep it moist in a plastic bag until they are ready to use it.

Plants may be started in containers made of plastic, styrofoam, or pressed fiber. The container must have holes in the bottom for drainage. When members are ready to sow seeds, have them fill the flat or container with the medium and firm it well at the edges and corners. Next, they should make rows by pressing the edge of a plastic or wooden plant label to a depth of 1/4 inch. They should not cover very fine seeds such as petunia, snapdragon, and begonia. Most other seeds should be covered with about 1/4 inch of mix or vermiculite. Youngsters should then soak the medium by setting each container in a pan filled with two inches of water and leave them for one hour.

Next, instruct participants to slip each container into a plastic bag and put it in a warm (70°–75° F) place with good light, but not direct sunlight. They will remove the bag in stages after the seedlings emerge. At this time, have them also move the plants into sunlight and keep the medium moist.

All growing plants need elbow room to be healthy and develop large numbers of flowers. When your seedlings have developed two true leaves (after the development of seed leaves), they must be thinned to the spacing recommended on the seed packet in order to

receive enough light, water, and nutrients. You may try to transplant extra seedlings by carefully lifting each one out with a knife or narrow trowel. Otherwise, you can pinch out the unwanted seedlings.

Although members' prepared or home-made peat-lite mix contains some fertilizer, it is necessary to provide supplemental nutrition for seedlings that remain in the mix for more than four weeks. Use a soluble fertilizer weekly at one-half the recommended strength.

Fluorescent Lights and Heating Cables

When the appropriate environmental conditions for seed starting are not available, you and your group members can create them with artificial light and heat. A basement room or even a large closet can serve as a seed-starting area if rigged with heating cables and light fixtures. Heating cables can be purchased at local garden supply stores. Snake a thermostatically controlled heating cable below the seeding containers so that heat will be distributed evenly over the area.

For light, use four 40-watt cool-white fluorescent tubes in a reflecting fixture, keeping them lighted for sixteen to eighteen hours daily. Set the fixture 6-8 inches above the top of the seeding containers. The containers can be slipped into clean plastic bags to maintain high humidity. Seeds that require an exclusion of light for germination should have their containers covered with opaque plastic.

Pillow-Pak Gardening

The use of a plastic tube filled with a lightweight medium is an easy way to grow annuals at home or in the classroom. To make pillow-paks, you can use plastic tubing cut to any convenient length or old bread wrappers. Show members how to fold the tubing over at one end and staple it shut. After they fill the tube with peat-lite medium, have them fold and staple the other end. Tell them to be sure the medium is moist before they fill the tube. Then they should cut one to three slits in the tube and place a seed or seedling in each opening.

To increase drainage, youngsters should cut several additional slits along each side of the pillow-pak. They will add additional water only as the medium dries, using a small funnel to facilitate pouring. After the initial watering, a second application may not be needed for ten to fourteen days.

Members may place their pillow-paks on a window sill, in a porch box, or on a patio. If they wish to plant the pillow-paks in the ground, they should first

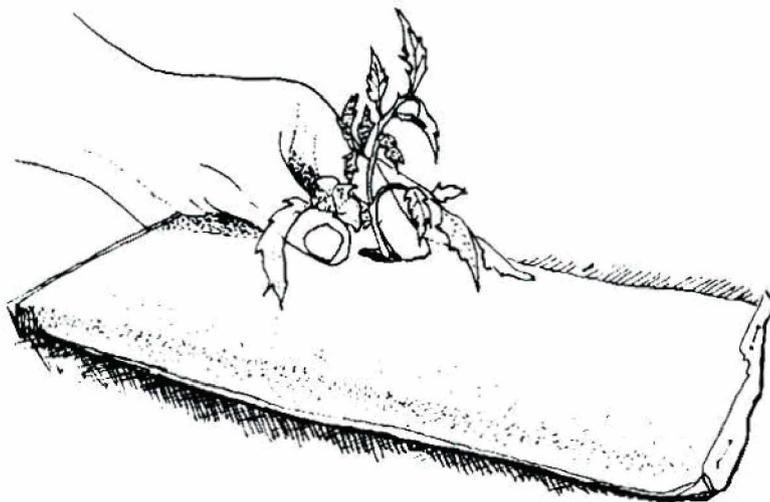
make slits on the bottom of the pak with a knife to allow the root system to penetrate the soil and thus obtain moisture.

If the plants in the pillow-pak are kept alive longer than twelve weeks, additional fertilizing may be needed. Group members should provide this by applying a soluble complete fertilizer at one-half the recommended strength at each watering.

Investigations

Ask group members to try growing nine small containers of seedlings of a single variety of marigold or zinnia. For the first three containers, they will vary the temperature from 50° to 60° to 70°. For three other containers, they will set one in full sun, one in filtered light, and one in darkness. For the last three containers, they will keep one consistently moist, water the second only at the time of sowing, and water the third each time that the medium dries on the surface.

Have members keep a record of how the various environmental conditions affect germination success, rate of growth, and height of seedlings.



Lesson 2.

Planning and Planting an Annual Garden

This lesson covers the basic gardening principles of proper planning, soil preparation, planting, weed control, watering, mulching, and cultivating of annual beds. Care of annual flower beds is a process that continues throughout the growing season. Success with annuals is based on selecting proper site conditions for each type of plant.

You may start the planning phase of this lesson while seedlings from lesson 1 are growing indoors, or begin it later in the spring by buying plants ready for planting into the garden. ❀



Materials

- paper (preferably graph paper), pencil, ruler
- seed catalogs describing annuals
- tools: spade or spading fork, iron rake, trowel, hoe, heavy cord, watering can
- agricultural limestone, peat moss or compost, granular or soluble fertilizer
- seedlings of annuals, grown from lesson 1 or purchased ready for planting

Planning the Garden

To help group members choose plants for their garden, have them study the colored pictures and descriptions in flower seed catalogs and speak to other gardeners about the difficulty of growing particular species. California poppies, for example, are beautiful flowers, but they do not bloom reliably when grown in the Northeast.

Have group members measure the area where the garden will be and make a plan on paper using a scale. Graph paper is easiest, especially for beginners. A suggested scale is 1/2 inch on paper for each foot of garden. A smaller scale may be necessary for larger gardens. Members should mark the measurements in feet on their garden plan.

Group members should indicate on their plan where each variety will be planted. Tell them to give primary consideration to the following factors:

mature height: the garden plants should be divided between low-growing foreground types, tall upright background types, and middle-height plants for the middle of the border.

- *flower color:* varieties set next to each other should have complementary or contrasting flower colors, but should not clash (for example, pinkish-purple next to orange).

Consideration must also be given to the available light in a location. Annuals such as marigolds, zinnias, and petunias do best in full sun, while begonias, salvia, and ageratum thrive in light to moderate shade.

If there are buildings, walls, fences, or trees near the garden, these should also appear on the plan. Youngsters should include an arrow indicating where north is located in relation to their garden.

Preparing the Soil

In the fall before planting, work on improving the areas you plan to use. You and your group will need to remove all trash, large stones, roots, and other troublesome materials. In the spring, you can then begin to prepare the soil thoroughly. It is better to grow a small bed of flowers in well-prepared soil than to try to grow many flowers in a poorly prepared site.

Show group members how to tell when the garden is ready for planting in the spring by squeezing a handful of soil. If it crumbles when squeezed, the soil is ready for spading. If it forms a mud ball, you and your group should wait a few days and test again.

Explain to members that annual flowers grow best at a soil pH range of 6.0–7.0 (pH is a measure of how acid or alkaline a particular soil is). To prepare a soil for pH testing, members should dig several small samples to a depth of 4 or 5 inches, mix these together, and submit about half a pint of the mixture to your local Cooperative Extension office or garden center. If the soil test indicates that lime is needed, your group should apply half the quantity before spading and half afterward.





Adding organic matter (peat moss, compost, well-rotted manure, or peat humus) to soil makes it more workable and allows it to drain more easily. Have youngsters spread the organic material over the soil, then spade the garden, turning under lime and humus. Alternatively, you could mix these materials into the soil by rototilling to a depth of 8 inches. Youngsters should also break up soil lumps with a hoe and smooth the surface with an iron rake, taking out all stones and very hard lumps of soil.

You or group members should next spread 1 1/2 to 2 pounds of granular fertilizer such as 5-10-5 per 100 square feet of garden and work it into the soil with the rake. A pint jar holds about 1 pound of 5-10-5. Alternatively, you could drench the soil with a solution of a soluble garden fertilizer or use an organic or other slow-release fertilizer at rates recommended on the package. Make sure your group members always wear gloves when working with fertilizer.

The garden is now ready for planting.

Planting the Garden

If members have not grown their own plants, now is the time to buy some from a greenhouse, garden store, or nursery. Youngsters should use their plan to decide how many plants will be needed. Plants are normally set 8-12 inches apart, depending upon their size when fully grown.

Wait until danger from frost is over to plant the garden. Late frosts may kill tender annuals if they are planted too early.

Instruct your group members to keep as much soil around the seedlings as possible. They should dig holes for the plants with a trowel, loosening the sides of each hole with the trowel.

A cloudy day or late afternoon is a good time for transplanting. Some shade (provided by inverted flower pots, for example) may be necessary for a few days. Shade keeps plants from wilting after transplanting. Have your group members give the seedlings a little water each day until they are established.

Summer Care of the Garden

Weeding

Weeds are one of the main problems in the summer flower garden. Unless they are removed early while still small, they will compete with the flowers for moisture and fertilizer and will look unsightly. Have the youngsters pull or dig out all weeds once a week.

Mulching

Your group should add a light mulch of about 3 inches to the garden. Mulches are any material used to cover the soil between rows or among plants. Explain to your group members that organic mulches keep the soil surface from crusting, prevent many weeds from growing, reduce moisture evaporation from the soil, and add valuable organic matter to the soil.

Wood chips, bark mulch, shredded leaves, and straw are all good mulches for annuals. Black plastic and landscape fabrics can also be used as mulches. Both will greatly reduce weed growth and soil moisture losses, while the landscape fabrics will also allow water

and oxygen to pass through to the soil. Because many gardeners do not like the appearance of sheet plastic or landscape fabric mulches, they often will cover them with a top mulch, such as wood chips. This also extends the life of the synthetic mulches, since they are not exposed to ultraviolet rays from the sun.

Watering

During dry periods, water the garden once or twice a week to a depth of 1–2 inches, using soaker hoses, drip or trickle irrigation systems, or overhead sprinklers. Whichever system you and your group choose, remember that it is far better to water infrequently and deeply than frequently and lightly.

Cultivating the Garden

After your group has thinned and transplanted the plants, they will need to work the soil only enough to keep the soil crust broken up. Shallow cultivation using a push type hand

cultivator or a sharp hoe is all that is necessary to maintain a loose soil and to keep down weeds. Mulched soils should *not* need any cultivation.

Investigations

Certain annuals make especially good cut flowers. Among these are marigolds, zinnias, China asters, and sunflowers. Show your group members how they can influence the size of individual blooms by pinching out all buds on a stem except the terminal bud. Is the resulting flower larger than the terminal flower on other stems?

Annuals are not only attractive to humans; they are also attractive to several insect pests. Your group could keep a gardener's log of which insect pests attack the annuals and how heavy their population becomes. Consult with your Cooperative Extension agent on identification of particular insects and recommended methods—especially nonchemical ones—for managing them.



Perennial Flowers

General Information for Leaders

Perennial plants have gained tremendously in popularity in recent years.

Many of the most popular garden flowers are perennials, including iris, peonies, chrysanthemums, and daylilies.

Increasingly, less well-known perennials such as coreopsis and gaillardia are also being grown by home gardeners.

By definition, perennials are herbaceous plants with root systems that persist from year to year. Because of this, gardeners often make the mistaken assumption that perennials will last forever with little or no care. Just like all groups of plants, perennials require regular attention and maintenance. If cared for, perennials can add much color to any border and also provide many cut flowers for your own home and those of your group members. ☘



Single-flowered Peony

Where to Grow Perennials

Of the many types of perennials, you can usually find one or more that will grow wherever there is good, well-drained soil. Certain perennials do well in shade; others must have sun all day; many perform best in a half day of sunlight. Too much wind is hard on any kind of flower, but it is especially damaging to tall perennials like delphiniums and lupines. Thus, a relatively protected location is preferred.

Good backgrounds for perennials are shrub borders, hedges, or green fences. They also look well along a lawn edge, in front of shrubbery, or in the small strip between the boundary line and the driveway.

Spring-blooming Perennials

Your group's perennial gardens may have some or all of the flowering plants discussed in the following paragraphs. For descriptions of other plants, refer to the lists on pages 20–21.

Anchusa

Anchusa, pronounced "an-kew-sa," is an odd name. If it is difficult to remember, call it by its nickname—bugloss or perennial forget-me-not. This perennial has blue flowers, grows from 3 to 5 feet tall, and has large, heavy, hairy leaves. *Anchusa* is one of the few perennials that bears a good blue-colored flower.

Divide older plants in the spring by cutting the root mass into three to four sections. Reset the divisions in your perennial border. Because anchusa grows tall, try planting it behind dwarf daylilies. Like many of the perennials mentioned in this guide, anchusa needs lots of sunshine, so do not hide it under a bush. Give anchusa a stake and support it with soft twine.

Bearded Iris (*Iris germanica*)

The name *iris* comes from the Latin word *iridis*, "rainbow." Sometimes iris is also called "flag." The bloom of the bearded iris, which resembles the orchid's, appears in May.

Modern iris hybrids are high maintenance plants—they must have well-drained soil and good air circulation to prevent foliage diseases.

The stems, which are thick brown branches at the soil surface, are called *rhizomes*. To get new iris plants, divide old rhizomes in July and plant them in your perennial border. Each rhizome should include one fan of foliage. Be sure to put them in full sun, in a location where other plants can hide their fading summer foliage.

Peony (*Paeonia*)

Peonies bloom from May to June and make a good background for annuals. They also make a good, low, summer hedge. Peony foliage is excellent in flower arrangements, too. Because peonies grow about 3 feet tall, set them at the back or middle of your perennial border. They like lots of sun, so do not plant them on the north side of the house or underneath trees and shrubs.

Peonies have four flower types, from a single circle of petals with a yellow center to a completely double flower.

Each type has a name: single, Japanese, anemone, and the double types. Their colors range from red to white.

You may divide perennial border peonies from an old clump. Dig it up in September, cut it apart carefully, so you will not break any of the buds, or eyes, from the thick roots. Each root—or "toe"—that has three or more eyes makes a new plant. As you set each division or "toe," be sure the eyes are only 1 to 2 inches underneath the ground. If you plant them deeper, they will not bloom. Set the plants 3 feet apart, because peonies need plenty of room (see p. 26).

Have a good welcome ready for them. Into each hole drop a shovelful of rotted manure or compost and a handful of complete fertilizer such as 5-10-5. Mix with soil thoroughly before planting. Do not expect your new peony plants to have many blooms the first year.

Summer-blooming Perennials

Coreopsis

Coreopsis is a popular yellow daisylike flower, sometimes called "tick seed" because its seed looks much like a tick bug.

Coreopsis blooms from June until frost. The annual forms have narrow, light-green leaves and yellow flowers that are from 2 to 3 inches across. The long, graceful stems of the flowers make them attractive for indoor use. Continual removal of the faded flowers before seeds form ensures a supply of *coreopsis* blooms all summer. Dwarf varieties of *coreopsis* are also available.

It is best to divide the old, crowded plants in early spring and to reset them



Bearded Iris



Double-flowered Peony

about 3 feet apart. All coreopsis asks is plenty of sunlight and a well-drained soil.

Daylily (*Hemerocallis*)

The bright orange daylily that blooms along roads and on railroad banks is a summer perennial. Plant breeders have "tamed," or changed, the color, and your garden may have yellow, orange, maroon, or pinkish daylilies. Some nurseries grow only daylilies. A single plant may have from fifty to seventy-five blossoms. By choosing only four of the many varieties, you can have blooms for much of the summer.

Divide daylilies as soon as they have finished blooming. They like full sun or partial shade, but they are content with only four hours of sunlight a day. Some daylilies grow only 2 feet tall, whereas others show their flowers on 4-foot stems; therefore, select varieties whose height and color fit into your border plan. Plant them in large clumps next to shrubbery or wherever you need lots of foliage.

Daylilies grow in practically all types of soil, but they will bloom more if you mix organic matter such as compost into the soil when you plant them.

Gaillardia

Gaillardia, also known as blanket flower, has blooms of rich yellow with red centers. The cut flowers keep well and can be used for corsages.

Gaillardia is easily divided in the spring and is happy in any soil except heavy clay. As it blooms from June until after killing frosts it can be planted in front of iris. The many soft, hairy leaves tend to hide the iris after it has finished blooming. Because it grows to 3 feet, gaillardia

may be planted in the middle of the flower border. The variety 'Goblin' is more compact and especially heavy blooming.

Phlox

Phlox means "flame" in Greek. No doubt the bright red heads of phlox are the reason for its name. Phlox is found in many perennial gardens, probably because the large cluster of showy flowers come in many shades of red, pink, and white, and the plants vary in height and time of bloom. In fact, you can choose early and late varieties in all colors. A planting with colors graded from light pink to dark red is most striking. The blooms can also be used for cut flowers.

Phlox is best planted in groups in beds along driveways and paths and in front of shrubbery.

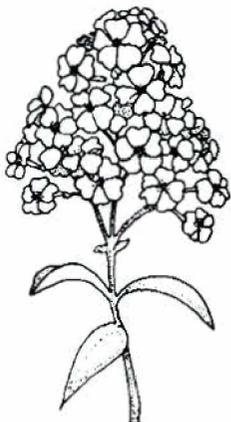
Divide phlox in spring and reset the outer sections of the old plants. They are vigorous plants and need plenty of moisture and good rich soil. If set too close together, phlox may be attacked by mildew. Thin stems in very early spring to promote better air circulation and thus reduce the likelihood of mildew attack. Spray any mildewed plants with a fungicide material or choose only mildew-resistant varieties.

Shasta Daisy (*Chrysanthemum maximum*)

The shasta daisy is a friendly neighbor of coreopsis. It, too, has daisylike flowers and blooms freely, giving many blossoms that fit into any summer flower arrangement inside or out of doors. Shasta daisies are related to fall mums. New varieties are double and look much like a chrysanthemum.



Daylily



Phlox

Sun and well-drained soil keep shasta daisies content. Divide crowded plants in early spring and reset them in the middle of the border, because they grow to a height of about 2 feet. Insects and diseases seldom bother shasta daisies. There also are dwarf varieties.

Fall-blooming Perennials

Japanese Anemone

The tall stems of pink, rose, or white flowers of Japanese anemone really attract attention in late summer and the fall months. These plants grow best in light shade and a well-drained soil, high in organic matter. Divide clumps only every four to five years.

Aster

Nature plants a beautiful perennial garden along country roads and highways with wild blue asters and yellow goldenrod. In autumn, your garden can be breaking into all shades of pink and blue with varieties of fall asters, also called "Michaelmas daisies." Use white varieties between the blues to heighten the blue color. Both the tall and low varieties bring that needed color to your perennial border.

Fall asters, as the name implies, bloom largely during autumn and have many uses. Plant the taller varieties to hide fences or as a background for lower perennials. They are at home in a naturalistic planting, and they might even be planted along the barn or garage.

Divide clumps in spring and reset them in your border. Asters grow best in full sun, but will bloom brightly in partial shade. The plants grow rapidly in almost any soil, and you will have to

stake the tall varieties. Pinch plants in early summer to reduce the need for staking and to force better branching.

Hardy Chrysanthemum

There is no question that chrysanthemums are the kings of the fall flower garden. Different varieties bloom from late August through October. Their flower size and type is also quite variable, from tiny buttons, to familiar daisies, to giant balls.

Although there are many specialized techniques for altering the blooming time and size, propagating, and pruning chrysanthemums, the basic cultural practices are to grow plants in a location with full sun and a well-drained soil and to fertilize plants several times during the growing season. When new shoots have grown 6 inches tall in the spring, pinch them back to promote side branching. Divide mums every other year in early spring.



Hardy Chrysanthemum

Perennials That Thrive in Shade

Often a portion of a perennial border is shaded by a tall tree or large shrubs. Some perennials do not like this and show their disfavor by producing few blooms. The following perennials bloom even if shaded part of the day:

Bee balm
Bellflower
Bleeding heart
Columbine
Daylily
Dutchman's breeches
English primrose
Japanese anemone
Monkshood
Plantain lily (Hosta)
Siberian iris
Tufted pansy
Violets



Living Bouquets

Many perennials last a week after they have been cut. Be sure your perennial border has some of the following:

Baby's breath
Chrysanthemum
Coralbells
Coreopsis
Delphinium
Gaillardia
Iris
Mountain bluet
Painted daisy
Peony
Phlox
Shasta daisy



Perennials to Plant in a Dry Corner

Some perennials will not grow normally in a soil that dries out quickly. If one end of your perennial bed dries out and the plants wilt, try growing the following:

Baby's breath
Blanket flower (*Gaillardia*)
Daylily
Golden marguerite
New York aster
Rudbeckias
Yarrow

Biennials

Halfway between annuals and perennials, biennials produce foliage the first year, bloom the second year, and then die. Many also send out seed after flowering to continue the cycle for future years.

Note: Some plants, such as hollyhock and foxglove, have traditional biennial types and newly hybridized annual forms. Others, including English wallflower and money plant, can be started in early spring to be grown as an annual or in midsummer to bloom the next year.

- Hollyhock (*Alcea rosea*): biennial, except new varieties (e.g., 'Majorette')
- English daisy (*Bellis perennis*): perennial, often grown as an annual
- Canterbury bell (*Campanula medium*): a true biennial
- English wallflower (*Cheiranthus cheiri*): see Note above
- Sweet William (*Dianthus barbatus*): both annual and biennial forms available
- Money plant, Honesty (*Lunaria annua*): see Note above
- Forget-me-not (*Myosotis alpestris*): a true biennial, annual species also available

Lesson 3.

Planning and Planting a Perennial Garden

Perennial flowering plants have become increasingly popular in recent years.

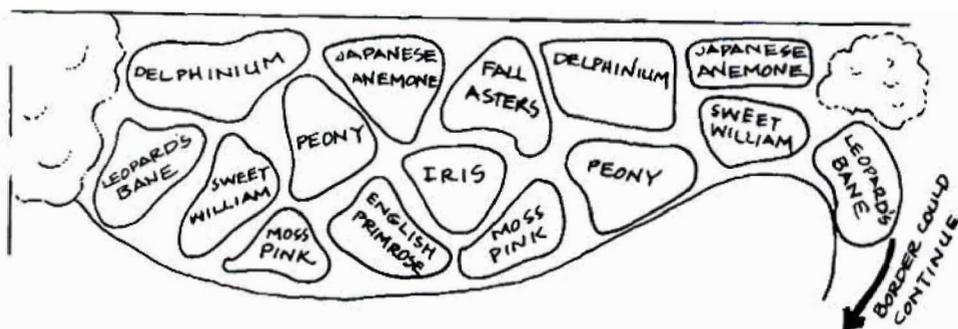
Because perennials emerge year after year, people make the mistake of assuming that they need little care. In this lesson, your group members will learn how to design and care for a perennial garden. 🌸

Materials

- paper (preferably graph paper)
- pencil
- ruler
- tools: spade or spading fork, iron rake, trowel, hoe, heavy cord, watering can
- supplies: organic matter (peat moss, humus), commercial fertilizer (such as 5-10-5), limestone
- perennials (see lesson 4 for propagation methods or buy plants)

Planning

You would not try to build a house without a blueprint; similarly, you and your youth group should not develop a perennial garden without a plan. Instruct participants to use a scale of 1 inch for every 2 feet of border, or 1 inch for every 1 foot of garden. If your border is 20 feet long and 5 feet wide, the plan will fit on a piece of paper a little longer than 10 by 2 1/2 inches wide, or 20 by 5 inches, depending on the scale that you use. A flower border with a slightly curved front edge is more pleasing to the eye than one with a straight edge. Members may cooperate on a group plan or may prefer to develop individual plans.



Help the youngsters learn as much as they can about the care and characteristics of each plant that they plan to use. Remind them to consider a plant's sun or shade preference, habit of growth, height and spread, season of bloom, and flower and foliage color. You may wish to consult *Sequence of Bloom of Perennials, Biennials, and Bulbs* (see References) for more information on specific plants.

Suggest that members place the plants in groups rather than in straight rows and plant the taller perennials at the back of the border where they will not shade or hide the smaller ones. Your group should select varieties that bloom at different times so flowers will be in bloom all season. Also, remind them to select color combinations that are complementary or contrasting, but not clashing. Certain closely related colors, such as scarlet and orange-red, will clash. Including too many colors can also be distracting. Members should write on the plan where each group of perennials is to be planted, the color, the variety, and the plant name.

Soil Preparation and Planting

The success or failure of a perennial garden can rest on how well the soil is prepared. Preparation can be done in the spring or fall. You and your group should use heavy cord to outline the bed and define the area to be worked.

A 2- to 3-inch layer of organic matter, such as peat moss or humus, can be dug into the soil before planting. Check the pH of the soil with a test kit. If the soil is too acid, add ground limestone to raise the pH to between 6.0 and 6.5. The organic matter and ground limestone can be worked into the soil at the same time.

Add 1 1/2–2 pounds of a complete fertilizer, such as 5-10-5, to each 100 square feet of border area (to figure out how many square feet your garden is, multiply the average width by the length). Work the fertilizer into the top 4 inches of soil.

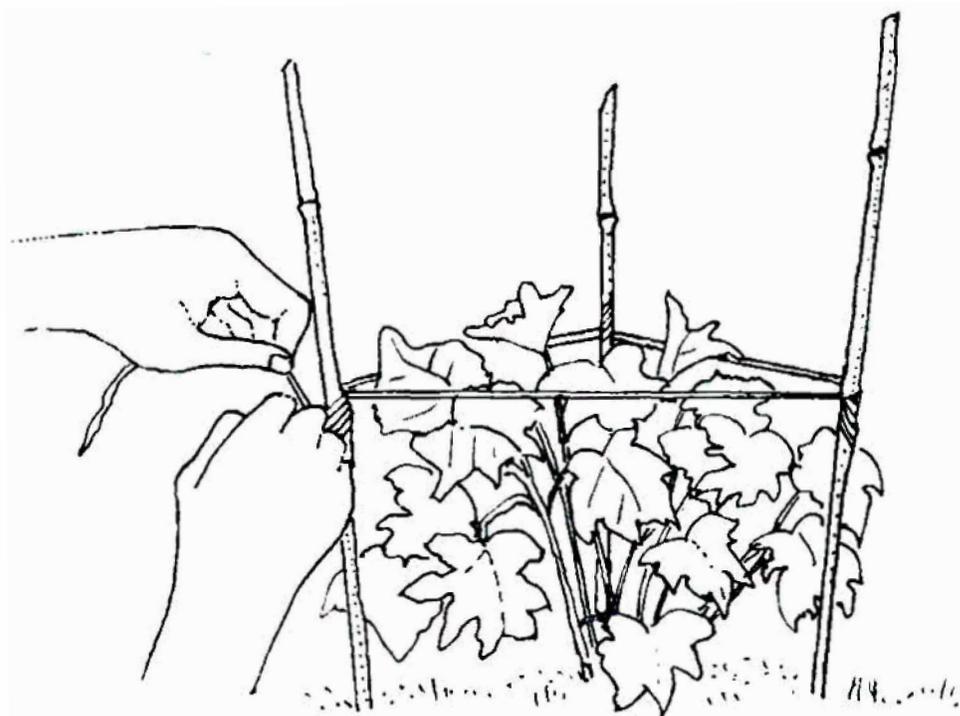
After you and your group have prepared the soil and are ready to plant, use limestone to mark the various planting areas indicated on your plan. You can also mark the areas with a hoe handle, but the limestone will show up better during planting.

The group's plan will help in deciding how many plants will be needed. Plants are normally set 1 to 1 1/2 feet apart, depending upon their size when fully grown.

Care of the Perennial Garden

Once the garden is planted, one of the most important aspects of perennial culture is weed control. Generally, the smaller the weeds are, the easier they are to pull. A 3-inch layer of finely ground wood chips, shredded bark, or other organic mulch spread around the plants and on the bare spots in the border not only keeps down weeds but helps to hold moisture during summer. As the mulch decomposes, it adds valuable organic matter and some nutrients to the soil. Plan to add a thin cover layer of additional mulch every two to three years.

To fertilize perennials, your group should apply a balanced soluble or granular fertilizer around the base of each plant in the spring. When using granular materials, have group members water the entire bed afterward to ensure nutrient penetration into the soil.



During hot summer weather, make sure group members water the perennials to a depth of 3–4 inches once per week. Light waterings cause the roots to grow only near the surface where they are more prone to drought-related injury. As described earlier, mulches help to keep moisture in the flower beds.

Tall plants, such as delphiniums and peonies, may need stakes or cages to support them. Instruct members to tie stalks loosely to pairs of stakes in two to three places to prevent the plant stems from snapping. The best time to place wire cages around these plants is in early spring, so the developing foliage can hide the wire but the stems can be supported by it.

Investigations

Certain perennials (such as chrysanthemums, iris, daylilies, peonies, and hostas) are available in a tremendous variety of forms. Ask your group members to try growing a garden bed of different types of a single plant. They may be amazed at how varied it can be and how long blooming time can be extended!

Lesson 4.

Propagating Perennials by Seed and Division

In this lesson, youth group members will learn that the way in which a perennial is propagated depends on the type of plant and the desired length of time until the plant comes into bloom.

Most perennials can be propagated vegetatively (which involves dividing or cutting the mother plant) or by seed. All vegetatively propagated plants are genetically identical to the mother plant. Plants grown from seed may each have a unique genetic identity.

The time for beginning this lesson will vary depending on the type of plant and propagation method you choose to use. 🌸

Materials

- pruning shears
- spade
- spading forks (2)
- organic matter
- phosphorus (bone meal, superphosphate)
- rooting hormone
- propagation pot or flat
- sand or perlite
- clear plastic
- soil heating cable
- fluorescent light fixture
- cold frame

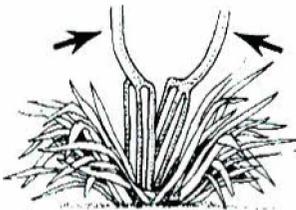
Division

Most perennials grow larger each year, usually developing into clumps. As clumps expand, they compete with other plants, eventually causing crowded and unhealthy conditions. Some perennials, such as chrysanthemums, will develop a healthy outer ring of growth surrounded by a dying center.

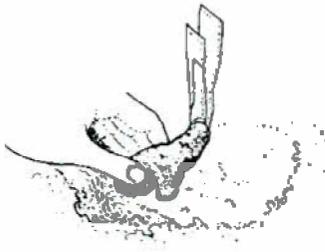
The beauty of dividing perennials is that it produces new plants while allowing for the rejuvenation of old clumps. The divisions can be set elsewhere in the garden, can be given as gifts, or can be traded with a friend.

A general rule for perennials is to divide spring- and summer-blooming species in later summer or fall, and fall-blooming perennials in the spring. This provides plants with nearly a full growing season to reestablish before flowering. A couple of exceptions to this rule are Oriental poppies, which should be divided when new shoots appear in July, and bearded iris, which should be divided in June or July while relatively dormant.

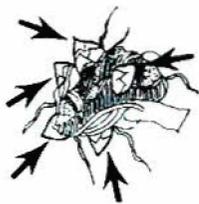
To make digging and dividing easier, your group needs to water the perennial bed well. The dividing process is simple. First, to clear the field for the operation, have members prune the plants to be divided to within 6 inches of the ground. Next, have them dig the entire clump out as completely as possible. If the center has died out, have members divide the living portion into small sections for replanting. Clumps that are completely living can be divided into four or six equal wedges.



Daylilies can be especially difficult to divide. Their thick, swollen roots completely ensnare around each other like interlocked octopuses. The best way to divide such stubborn clumps is to insert two sharp spading forks into the center, back to back. Then press the handles toward each other, using the leverage of the tines to pry the clump apart.



When dividing bearded iris clumps, cut out and discard any sections of the rhizome (the thick, underground stem) that are rotten or have evidence of borer holes. Reset individual rhizome pieces that contain single fans of foliage.



Peonies, which live for such long periods of time, occasionally need dividing. After digging the root mass in late summer, divide into root sections that each contain three to five eyes, or buds, for next year's growth.

When replanting divided perennials, have your group prepare the planting hole by mixing in some aged organic matter (compost, leaf mold) and a source of phosphorus (bone meal, superphosphate). Water the new divisions regularly until they become established.

The following guide will help you and your youth group decide when to divide your perennials. Appearance of the clump, however, will eventually be the best guide as you become familiar with the growth habits of these plants.

Divide Each Year: bee balm (*Monarda*), false dragonhead (*Physostegia*), common valerian, hardy ageratum (*Eupatorium*), hardy marguerite (*Anthemis*), sneezeweed (*Helenium*), chrysanthemums

Divide at Two-Year Intervals: hardy asters, shasta daisies

Divide at Three- or Four-Year Intervals: bearded iris, phlox, sea thrift (*Armeria*), pyrethrum

Seldom Need Dividing: bleeding heart, pcony, Oriental poppy, Japanese anemone, lupine, baby's breath, gas plant (*Dictamnus*)

Stem Cuttings

A less severe manner of obtaining favorite perennials is to take stem cuttings from established clumps. Among the perennials that lend themselves to this treatment are yarrow, chrysanthemum, delphinium, baptisia, scabiosa, and candytuft.

In the spring, cut all basal shoots when they are 3–4 inches long, at crown level or just below. Dip the base of each cutting in a rooting hormone, then place this treated base into a pot or flat filled with coarse sand or perlite. Keep the rooting medium moist (but not wet). Maintain high humidity by setting a tent of polyethylene plastic over the container. Place the container in a bright spot out of direct sunlight.

After several weeks, group members should check to see if cuttings have rooted by pulling up gently on each stem. If considerable resistance is met, they can dig out each cutting with a spoon or narrow trowel. These new plants can be set in the garden or potted into 3- to 4-inch containers for later planting.

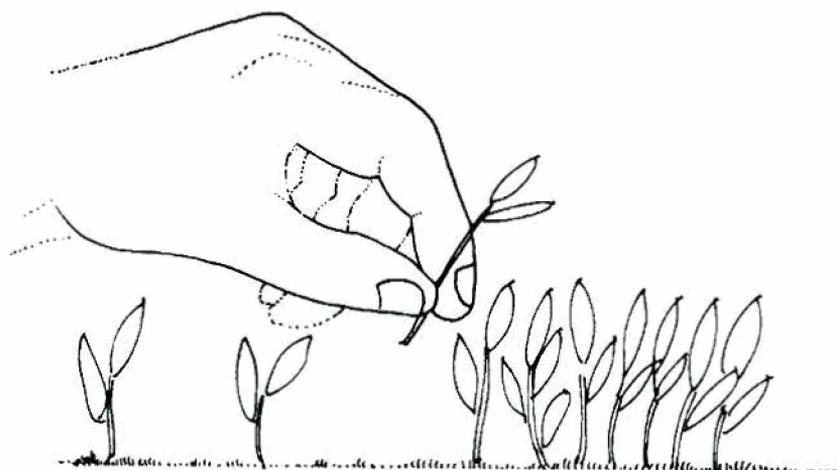
Seed Propagation

Your group might prefer to start perennials from seed: it is an inexpensive method of generating many new plants of one type; it allows you to grow the latest and most exciting cultivars; and it is satisfying to grow a plant from seed to blooming.

Modern, hybrid perennial seeds are available from seed catalogs and garden centers. In late winter, while snow still flies outside, members should sprinkle seeds on a moist germination mixture, such as a peat-lite mix. They will need to follow label directions of whether or not to cover the seeds lightly. To speed germination, have them set the seed container on a soil-heating cable. They should also cover the container with glass or plastic to increase humidity.

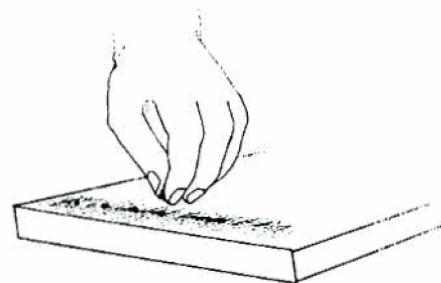
After seedlings emerge, instruct youngsters to roll back the plastic and set seedling trays under a four-bulb fluorescent light fixture, in a south-facing window, or in a greenhouse. When each seedling has developed two pairs of leaves, members should dig and set each one carefully in a separate cell, a market pack, or its own peat pot. They can continue to grow the young plants indoors until the season's last frosts.

Before setting seedlings into the garden, your group will need to accli-



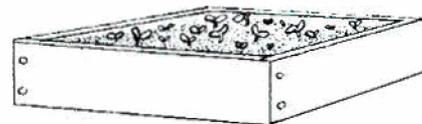
mate them to outdoor conditions by putting them into a cold frame. After at least one week of acclimating, seedlings may be planted into their permanent positions. Explain to your group that the plants will probably not bloom this first season. Some species, like peonies, may take several years to mature to a flowering stage.

An alternative routine for seed sowing is to start seeds outdoors in a cold frame in June. If your group wishes to try this method, they should transplant the resulting seedlings into separate containers and leave them in the cold frame through the winter. Plants of blooming size can be set into the garden the following spring.



Investigations

Have your youngsters try varying the conditions in which they set stem cuttings. For example, they could treat the base of some cuttings with a rooting hormone, but not the stems of other cuttings of the same type of plant. They could also set a plastic tent over one propagation flat, but not over a second one. Ask them what differences they notice in how well the cuttings root.



Spring- and Summer-flowering Bulbs

General Information for Leaders

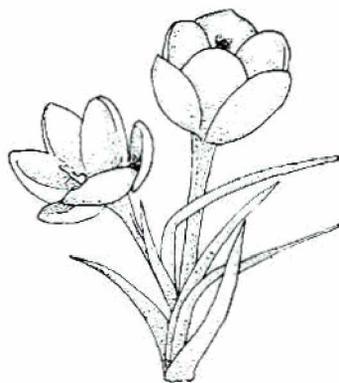
Spring- and summer-flowering bulbs are easily grown and provide flowers for color, cutting, or mass effect. Daffodil, hyacinth, and tulip are spring-flowering bulbs; dahlia tubers, gladiolus corms, and lily bulbs bloom in summer or early fall. The term *bulb* in this section will also include corms, tubers, and rhizomes—defined below—because all of these structures store food for the growing plant.

Bulb: Underground storage organ composed of an enlarged, fleshy, shortened stem covered with modified leaves (bud scales). Example—tulip.

Corm: Flattened underground stem with few nodes (growing points). Example—crocus.

Rhizome: Horizontal thickened stem that grows partly or entirely underground. Example—iris.

Tuber: Short, fleshy underground stem with tiny scale leaves, each with a bud in its axil. Example—potato.☞



Crocus

Spring-flowering Bulbs

Among the more popular spring-flowering bulbs are narcissus (which includes daffodils, jonquils, and paper whites), tulips, hyacinth, bulbous iris, and the smaller bulbs, such as crocus, grape hyacinths, snowdrop, glory-of-the-snow, squill, snowflake, and aconite.

Spring bulbs are most effective when grouped **together within** a flower border, among shrubs, beneath spring-flowering trees, in a rock garden, or near a walkway where they can be observed at close range.

Chionodoxa

Chionodoxa, or glory-of-the-snow, grows 3–4 inches tall. Its name is based on its habit of blooming very early, while snow is still melting. Flowers are silvery pink, light blue, or white. Because of their small size, plant Chionodoxas in large clumps in rock gardens, in the front of borders, or under trees.

Plant bulbs 3 inches deep in the fall. Space them 2 inches apart within the clump. Leave bulbs in place until they become crowded, often five to eight years.

Crocus

These familiar, star- or cup-shaped flowers are one of the mainstays of the spring garden. Generally, the smaller types bloom earlier, from late February through mid-March. The larger, hybrid crocuses flower from March through much of April.

For earliest bloom, plant crocus corms 3 inches deep in sunny but protected locations. The growing point appears as a sharp tip in the center of the corm; make sure that it faces up. As with glory-of-the-snow, plant crocuses in clumps or drifts. The small-flowering types are especially well suited to rock gardens. Crocuses seldom need replanting.

Eranthis

Eranthis (winter aconite) is one of the very first bulbs (actually a tuber) to bloom in February. Its buttercup-like flowers contrast sharply with its skirt of frilled green leaves.

Plant the tubers 1 inch deep, in early fall, in sun or partial shade. To propagate plants, lift and divide the tubers in May. Replant the divisions at once.

Galanthus

Galanthus (snowdrop) is a welcome visitor as it pokes its nodding white flower heads 6 inches above late winter snows. It blooms in protected spots in mid-February. Single- and double-flowered forms are available, all with distinctive green marking on the white petals.

Plant snowdrops in large clumps of twenty or more. Or you can mix *Galanthus* with other small, early blooming bulbs. For best display, set the bulbs 4 inches deep, and 1 inch or less apart.

Hyacinth

Hyacinths produce showy, fragrant flower heads of pink, blue, red, yellow, orange, or white in midspring. They are most effective when used in formal plantings among shrubs, in borders, or next to the house, where their fragrance can be appreciated.

Hyacinths grow 6 to 12 inches high. The taller varieties may need support, especially in windy areas. Plant smaller bulbs 3-4 inches deep and 4-6 inches apart. Add 2 inches to the spacing dimensions for larger bulbs. Plant bulbs in October.

Handle these bulbs carefully, because they bruise easily. Leave them in place for several years. Since flowers become smaller each year, dig and discard the bulbs when blooms become too small for good display.

Iris

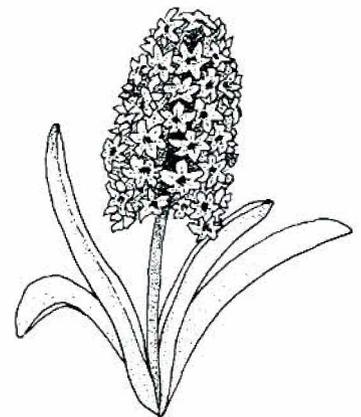
There are so many types of iris, and their classification is so complex, that this entire guide could be devoted to this one subject.

One way to classify irises is on the basis of their underground growth structure—those that grow from rhizomes versus those that grow from bulbs.

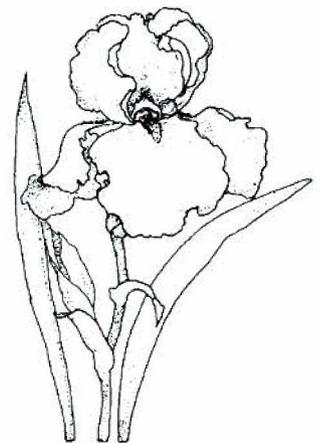
The rhizomatous types develop pointed, straplike leaves that grow in fans and produce stiff stalks that each bear one or more flowers. Popular colors are yellow, bronze, blue, purple, pink, and salmon. The most popular of the rhizomatous types are the bearded irises, with their fleshy hairs or beards on the outer petals.

Of the bulbous irises, the most popular garden types are the very tall Dutch forms and the tiny *reticulatas*. Dutch iris flower in early summer and are noted for their large, long-lasting blooms. Four-inch tall *reticulatas*, in shades of blue, purple, or white, are best suited to sunny but protected rock gardens.

Rhizomatous irises need special care in planting. Choose a well-drained



Hyacinth



Bearded Iris

location, and set the rhizome horizontally 1 inch below the surface. Trim the leaves to a compact fan, firm soil around the rhizome, and then water. Planting is best done in midsummer.

Plant iris bulbs 3 inches deep and 6 inches apart in October. Leave bulbs in place three to four years, then divide bulbils (offshoots) and replant.

Leucojum

Leucojum (snowflake) grows 16 inches tall. The most common type (*Leucojum vernum*) blooms in May. Its flowers are white like those of *Galanthus*, but much larger.

Select a planting site that is well drained and lightly shaded. A rock garden is ideal. Plant bulbs 4 inches deep in October. Space them 4 inches apart in clumps of 12 bulbs. Leave them in place for many years.

Muscari

Muscari (grape hyacinth) grows 6–8 inches tall. Most types bloom in mid-April, in shades of blue or white.

Use *Muscari* in rock gardens or scattered among shrubs as a ground cover. Plant bulbs 3–4 inches deep and equally far apart. It is unlikely that you will ever need to redig the bulbs since they naturalize freely.

Narcissus

The narcissus group includes daffodils, narcissi, and jonquils. They are classified into categories like trumpet, large-cupped, and small-cupped, by the length of the crown in the center of the flower.

Narcissi grow 3–20 inches high. The shortest forms are excellent for rock gardens, whereas full-sized plants work

well as clumps in garden beds or naturalized in lawns or fields.

Plant narcissus bulbs 4–6 inches deep and 6–8 inches apart. Dwarf narcissus can be planted to a depth of three times the length of the bulb. Blooming time varies, with the heaviest concentration in April.

After planting, daffodils and their relatives need little care and rarely need replanting.

Scilla

Scilla (squill) produces brilliant blue or more muted white flowers from early to midspring. They are best planted in informal groups at the edges of borders, beneath trees and shrubs, or in rock gardens.

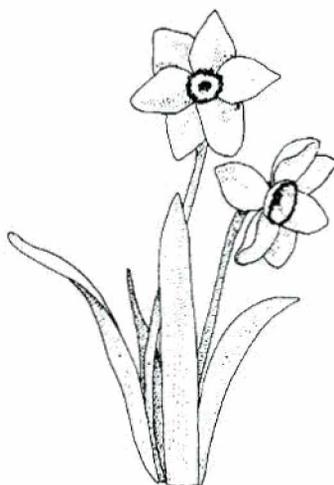
Plant bulbs 4 inches deep, in early fall, in sun or partial shade. Plantings multiply rapidly by self-sown seed or bulb divisions.

Tulip

Certainly the best known, and probably most loved, of all of the spring-flowering bulbs is the tulip. We can hardly think of Holland without imagining fields of brilliant blooming tulips.

There are many types of hybrid tulips, with different characteristics. Some of the most popular are

- **Single Early:** lower growing than late-flowering types; flowers open wide, nearly flat
- **Triumph:** angular flowers on sturdy stems of medium height
- **Darwin Hybrid:** large, square-shaped flowers on tall, strong stems



Narcissus

- **Lily-Flowered:** elongated flowers with pointed petals that bend outward at tips
- **Double Late:** flowers resemble poodles and are long lasting
- **Kaufmanniana:** flowers open into six-pointed star; leaves mottled

With so many variations, you are sure to find a tulip type that suits your needs and taste. Plant bulbs 6–8 inches deep, in mid- to late fall. They will bloom in April or May.

Flowers of most types become smaller each year. Dig and discard hybrid bulbs after about three years or when flowers become too small for good display.

Summer-flowering Bulbs

The most popular summer-flowering bulbs are canna, dahlia, and gladiolus (all of which are tender and require lifting and storage over winter) and lilies (which are hardier and can be left in the ground year-round).

Begonia

Tuberous begonias provide some of the most spectacular flower shows for shady areas, especially in containers. Plant the tubers in a flat of moist peat in March. When stems and leaves have emerged, transfer to 4-inch pots. Set into containers or gardens outdoors once all danger of frost has passed.

Once the flowering has slowed or stopped in late winter, dig the tubers and store them in a 40°–50°F room in a flat of dry peat moss until the following spring.

Caladium

All of the bulbous plants described thus far are grown primarily for their blooms.

Caladiums, in contrast, are valued for their stunning leaves in patterns of white, green, pink, or red.

Caladiums are most effective when grown in pots or in small masses in a flower garden (they look especially good in the center of a circular bed). The tubers can be planted 2 inches deep directly outdoors after air temperatures warm to 70°F, or they can be started indoors, as described for cannas.

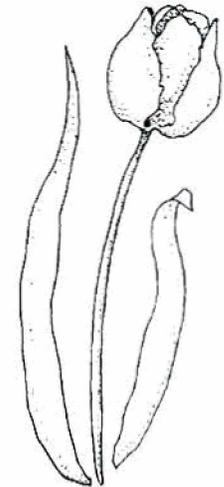
In the fall, dig the tubers and allow them to cure for one week in a warm, dry spot. Store the dried tubers in dry peat moss or perlite at 55°–60°F for the winter. In the spring, you can increase the number of tubers by cutting each one into pieces, with one or more eyes (buds) on each piece.

Canna

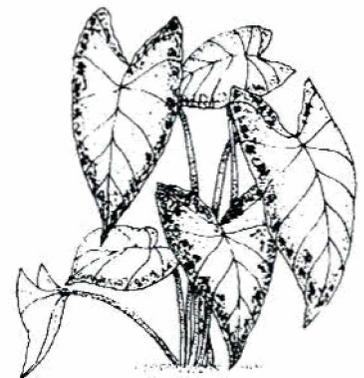
Just as with clothing styles, particular plants go in and out of fashion. Cannas do not enjoy the popularity they once did, but are still able to provide a beautiful and dramatic effect. A recent breeding breakthrough may bring about renewed interest. 'Tropical Rose' is a canna variety that can be started from seed in late winter and bloom that summer.

The tallest forms of canna grow 5 feet tall, while dwarf varieties are 18 to 30 inches tall. Flowers are red, pink, orange, yellow, and cream. Cannas look best in the background or center of flower beds, or in containers.

Plant canna rhizomes from March until May in flats filled with peat moss. Cover the rhizomes with 1 inch of peat moss and water them often enough to keep the peat moss damp.



Tulip



Caladium

When shoots appear, replant the rhizomes in 4-inch pots. Use a mixture of equal parts of soil, peat moss, and perlite or vermiculite. Leave the potted plants indoors in a sunny window until all danger of frost has passed. Then plant them outside in full sunshine.

Dig the planting site thoroughly and mix organic matter (compost, leaf mold, well rotted manure) into the soil. Plant the rhizomes just below the soil surface. Space them 12–18 inches apart.

Water and fertilize the plants at two-week intervals throughout the growing season. Apply a light ring of 5-10-5 or 10-6-4 fertilizer around each plant. Stake the tall varieties; they fall over easily.

After the first light frost of the fall, cut the stems off the plants. Then dig up the rhizomes and allow them to dry. During the winter, store the rhizomes upside down in dry peat moss or vermiculite at 50°–60°F.

Dahlia

Dahlias are among the great imitators of the plant world. Different forms have blooms that resemble peonies, orchids, anemones, cactus flowers, and daisy pompons. Flower colors are almost as varied, from red and orange to yellow, bronze, gold, purple, and white. Dahlias make great cut flowers, and they are lovely in flower borders.

To grow dahlias successfully, you must locate the proper site. Dahlias need full sun and a well-drained, moisture-holding soil. The ideal soil pH is neutral to slightly acid.

Prepare the soil and fertilize dahlias as described for cannas. Plant the tubers as

soon as the danger of frost has passed. Allow 2–3 feet between tubers for tall dahlias, 2 feet for medium plants, and 15 inches for shorter ones. Plant the tubers so that the eyes (growing points) are 2 inches below the surface.

Taller varieties of dahlias will need staking. The main shoot and side shoots should be loosely attached to stakes.

After the first fall frosts, cut back all stems to 6 inches. Then dig the tuber clumps and use a blunt stick to remove loose soil from around the tubers. In a flat, store the dry tubers on a 6-inch bed of peat moss, then cover with an additional layer of peat.

Gladiolus

Gladioluses enjoy their greatest popularity as cut flowers for arrangement, but they can also find homes in garden beds, if used carefully. The longest types of glads produce flower spikes 6 feet tall, with overlapping flowers 4 1/2–7 inches wide. Obviously, these types are best used in the back of borders or in bed by themselves.

Other gladiolus forms bloom at more reasonable heights between two and four feet. The color range of glad flowers is wide, from red to maroon, orange to pink, and many shades in between.

Plant gladiolus corms in rows 36 inches wide for harvesting as cut flowers, or plant groups of corms in beds. Start planting as soon as the soil is dry enough to work in the spring. Plant the corms 4–6 inches deep and 6–8 apart. Or, plant corms in 8-inch deep trenches, and fill in with loose soil as stems grow. When grown in this manner, glads seldom need staking. By



Dahlia

staggering planting dates between May and July, you will be assured of a continuous supply of flowers later in the season.

When shoots are 6–10 inches tall, fertilize the plants with one pound of 10-6-4 fertilizer per 100 square feet of space. Water the soil around the plants every ten days in hot weather.

Gladiolus corms should be lifted in the fall after a light frost. Work excess soil off the corms, then dry them in a warm, shady area. Store the larger corms for the winter in a well ventilated area between 35° and 40°F.

Lilium

Hybrid lilies are among the most beautiful plants grown from bulbs. They have many forms, heights, flowering times, and colors. All provide an eye-catching show of regal, beautiful flowers. Some of the most popular forms of hybrid lilies include

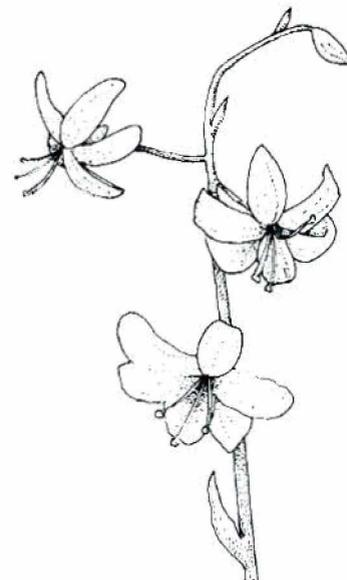
- Asiatics: widely varied in color or form; flowers upright or facing outward; very hardy and reliable; long blooming.
- Trumpets: offspring of four Chinese species; flowers range in form from narrow tubes with flared ends to large bowl-shaped blossoms; less hardy than Asiatics; fragrant.
- Turk's cap: includes many breeding lines; flowers are pendant (point down) with petals curving back.
- Aurelian: result from crosses of Trumpets with *L. henryi*; hardier than Trumpets, but often stems need support; very impressive blooms.

More than most bulbous plants, lilies are fussy about the location in which they are grown. They need a well-drained soil, full-day sun, but cool roots. One way to achieve this is a sunny location with low-growing plants set around the base of the bulbs.

Plant the bulbs at a depth that is three times the height of the bulb, with excellent drainage at the base of each planting hole. Space the bulbs 6–18 inches apart according to the height of the plants. Bulbs planted on their side are less prone to bulb rot. Water won't be held between the outer bulb scales, which ordinarily causes decay.

Water and fertilize the plants at frequent intervals during the growing season. Use a light ring of 5-10-5 or 10-6-4 fertilizer around each plant. Do not use high rates of high nitrogen fertilizers.

To provide the most strength to the bulbs, only cut a particular plant's stem for cut flower use every other year. Leave at least half of the stem to continue to nourish the bulb. When the leaves turn yellow in the fall, cut all stems at the base.



Lily

Lesson 5.

Using Spring-flowering Bulbs in the Garden

Hardy spring-flowering bulbs will provide years of beauty and enjoyment if planted in a well-drained site at the proper depth. Conduct this lesson with your group in September or October when bulbs are available. The planted bulbs will provide color in the garden by the following spring. The purpose of this lesson is to have group members learn where and how hardy bulbs may be planted in the garden. ☘

Materials

- plan of flower border from lesson 3 or graph paper, pencil, and ruler
- bulb catalog
- spring-flowering bulbs: for example, tulips, daffodils, crocuses, grape hyacinths
- knife
- trowel
- 5-10-5 fertilizer
- peat moss or other organic matter

Procedure

There are two different approaches to starting this project: members can modify their flower border plan to include spring-flowering bulbs, or they can develop a new plan on paper just for bulbs.

The beauty of a bed can be enhanced when annuals are planted next to spring bulbs, thus hiding the fading foliage of the bulbs and extending the period of bloom. Members can represent such an arrangement on paper by drawing the locations of the bulbs on a piece of trace paper which they then lay over the plan for annuals.

Based on the information given in the preceding section, have your youngsters determine whether the bulbs they plan to plant grow best in full sun or partial shade. Remind them also to consider the flowering height of each bulb when deciding on placement. Always plant taller bulbs where they will not hide medium-sized or shorter ones.

Before preparing new flower beds, your group should test the drainage of the soil. Have some participants dig a hole about a foot deep and fill it with water. If the water drains away in eight to ten

hours, the soil is sufficiently well drained. If water remains in the hole after ten hours, it will be necessary to improve the drainage of the planting site.

One way to improve drainage is to create a raised bed consisting of a coarse soil type, to a height of a foot or more over grade level. The edges of the raised bed can slope down to grade level or can be contained by landscape timbers or other edging.

Your group should dig and plant the bulb bed when the soil is fairly dry. Wet soil packs tightly and retards plant growth. Explain to members that if they can crumble the soil between their fingers, it is dry enough for digging and planting.

Members should add one pound of 5-10-5 or 5-10-10 fertilizer and a thick layer of peat moss or compost for each 50 square foot area. Then spade the soil to a depth of 8 to 12 inches to mix in the amendments and to increase aeration.

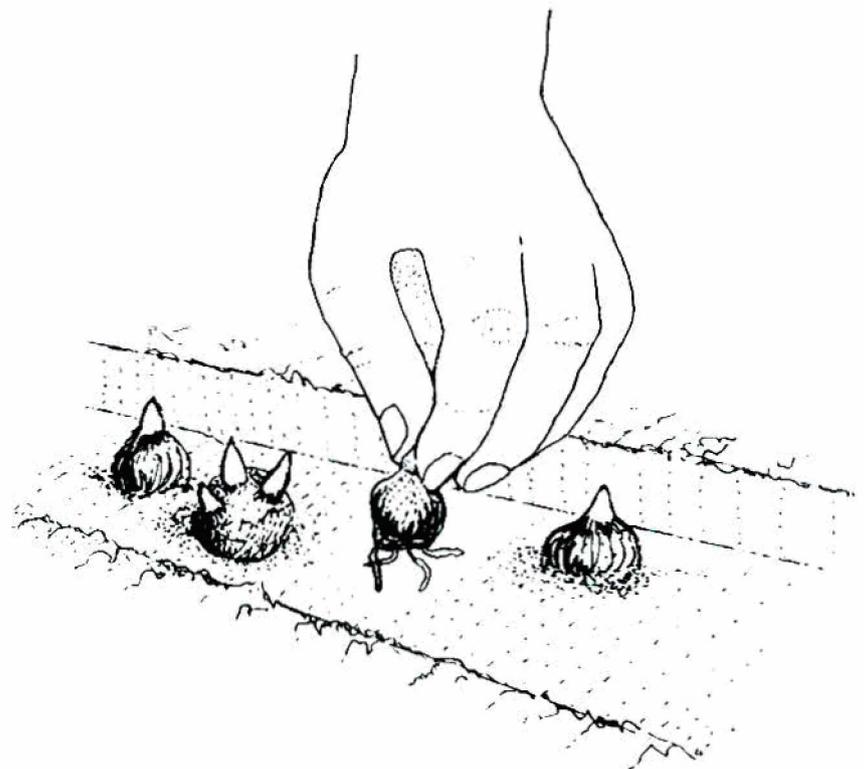
Instruct members to plant bulbs upright at the depths recommended earlier. They should then water the planted beds thoroughly to help settle the bulbs in the soil. They can use plant labels to mark the location and variety of each cluster of bulbs.

Investigations

Before your group actually starts planting their bulbs, cut lengthwise through a tulip or daffodil bulb. Show them that the entire plant, including the flower for next spring, is already fully formed within the bulb. Now cut through a crocus. This is not a true bulb

and does not have all the parts formed at planting time. At the tip of the corm is a bud which will develop into the new plant for the next season.

Another activity you can carry out with your youth group teaches them about "forcing"—altering growing conditions to allow plants to bloom at a different time than they normally would. Your group members might want to put some spring-flowering bulbs into flower pots and force them to bloom early indoors. For complete directions on how to do this, consult *Forcing Hardy and Tender Bulbous Materials* (listed in References).



References

Annuals. Time-Life Encyclopedia of Gardening. J. U. Crockett, ed. Time-Life Books, 1973.

Ortho's Complete Guide to Successful Gardening. B. Ferguson, ed. Ortho Books, 1983.

The following Cornell Cooperative Extension publications are available at your local Cooperative Extension office or can be ordered directly from the Resource Center, 7 Business and Technology Park, Cornell University, Ithaca, NY 14850:

Cornell Peat-Lite Mixes. 141IB43.

Culture of Spring-Flowering Bulbs. 141HGFS300.00.

Forcing Hardy and Tender Bulbous Materials (4-H Leader's Guide). NE 109.

Garden Flowers from Seed. 141IB20.

Rock Gardens. 141IB159.

Sequence of Bloom of Perennials, Biennials, and Bulbs (Including Height and Color Range). 141IB196.

The Types and Uses of Mulch in the Landscape. D. A. Rakow. 141 HGFS700.10. July, 1989.

Young People's Guide to Landscaping. 141L-7-6 (4-H Leader); 141M-7-6 (4-H Member).

