HORTICULTURE JUDGING AND IDENTIFICATION

A RESOURCE MANUAL
## HORTICULTURE JUDGING

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This publication is intended to be used by leaders as a guide for teaching 4-H members to have an enjoyable and more satisfying educational experience when learning how to judge and identify horticultural plants or crops. One goal of 4-H is to provide youth hands-on experiences and opportunities for developing their highest potentials in a chosen area. The skills needed to identify horticultural plants, their useful parts and products, and to distinguish and evaluate them based upon characteristics, are useful life skills. Development of life skills can be accentuated and enhanced when hands-on experiences are provided to youngsters. In other words, do not expect youngsters to judge and identify horticultural plants by reading this guide and studying the illustrations. Whenever possible, youngsters should be evaluating and identifying living specimens.

This teaching guide consists of two sections which parallel most horticulture judging activities in which 4-H youngsters will be participating. The first section provides information needed to teach youngsters about horticulture judging, including examples of how to set up floriculture classes and criteria used to evaluate cut flowers, foliage plants, and flowering plants. Criteria used to judge classes in other major divisions, such as vegetables, fruits, shrubs, or bedding plants, may be found in the 4-H Competitive Events Handbook located in your county extension office. The second section has nine identification lists consisting of illustrations and descriptions of some plants, insects, and weeds commonly found in horticulture judging contests. Use the identification lists to help you identify, locate, and collect living specimens for the 4-H members you are teaching.

Remember, a judging activity or contest is one small part of a total educational program to help develop attitudes, values, and skills that will assist young people in becoming productive members of society. Specific goals to achieve when teaching 4-H youngsters include:

- developing concern for society and the larger world
- increasing understanding of science and appreciation for nature
- developing good consumer skills
- developing life skills that include: creative use of leisure time; marketable attitudes and skills leading to a career; desirable interpersonal relationships; responsible citizenship; leadership; communication skills; and responsibility
**Understanding Needs of Youth**

To fulfill the objectives of the 4-H program, it is important to understand common needs of youth. These basic needs must be met in order for youth to progress to adulthood in a healthy manner. These needs include:

- To experience a satisfactory self-concept
- To experience success in achievement
- To become independent individuals
- To experience adventure
- To develop and accept one’s sex role
- To experience acceptance by peers and adults

**Characteristics of Youth**

Although children develop individual personalities, some characteristics are commonly shared by youth aged 13 to 15 years:

- They are learning to understand their bodies and develop a positive attitude toward sex.
- They have great need to feel wanted by contemporaries and be at ease with the opposite sex.
- They find joy and excitement in the active use of mind and body to express a philosophy of life.
- They are interested in pinpointing and finding answers for their own problems, with supervision.

**Implications for Leaders**

- Constant assurance is necessary to feel normal. Youth want to be part of something bigger than their world.
- Programs should continue to be one-sex, except when the objective is to know and feel at ease with opposite sex.
- Small group discussions needed to explore subjects of concern will stimulate opinions.
- Respected adult opinion is regarded highly, but don’t make decisions for youngsters or force opinions on them.

To summarize the key concepts outlined above, when working with youth this age, remember:

- Youngsters have zeal and vigor to direct individual lives; they want and need to feel they belong to an intimate group their own age and sex.
- The more important programs are those which invite recognition from peers rather than adults.

- This is an appropriate time to increase their acquaintance with the world at large through exploration.
- Social and other activities including both sexes are of interest if well planned ahead of time, primarily by the youngsters involved.
- Association with high-minded adults is very important at this time for youth to try out their values, to test their thinking, and to develop and challenge ideas for solutions.

**An Introduction to Life Skills**

Life skills are those skills that individuals use to help them cope with daily circumstances and to make important decisions. The 4-H organization has a long tradition of helping youth develop skills which they use later on in life to enhance the quality of their lives. In the 1970s 4-H formalized the teaching of life skills and made an effort to get all leaders to teach life skills to their club members. Pennsylvania 4-H is placing an increased emphasis on life skills and preparing youth for the twenty-first century.

The national 4-H organization has three set goals for youth development: (1) Youth will be able to make important daily and long term decisions now and in the future, (2) Youth will be able to build relationships in which both the youth and the other party mutually benefit each other, and (3) Youth will be able to be productive members of society.

Based on these three goals, five life skills have been identified: (1) personal development, (2) communication, working, and relating with others, (3) problem solving and decision making, (4) acquiring, analyzing, and using information, and (5) managing resources. One over-riding goal was also identified: *youth will be self-directing and self-motivated.*

As a 4-H leader, part of your responsibility is to prepare your club members for the future. How can you do this when you can only make predictions about what the future will be like? By helping youth develop life skills, you are helping them to prepare for a wide variety of future situations. Through 4-H you can help young people develop life skills which will aid them in social, academic, career, and leisure settings both now and in the future. Social skills can be developed through working with others, helping others with projects, and spending leisure time with others. Four-H members learn about and start hobbies or avocations which they may continue to pursue as leisure activities throughout their lives. These same skills used for hobbies may also be used in careers. Academic skill development is encouraged throughout the horticulture and plant science
curriculum which provides increasingly, mentally-
challenging projects.

4-H Educational Experiences

As a leader you can increase and maintain the
interest that is raised by allowing members to help
plan and conduct community events. Members gain
leadership and group skills by participating in
making and carrying out plans. Some ideas you can
use are:

- **Family involvement** in a kick-off party for present
  and prospective members and their parents
generates enthusiasm for the new year. Parents’
events might include an evening program pre-
sented by members, a potluck meeting with a
short 4-H program, or a summer family picnic.

- **Tours and field trips** are educational as well as
  recreational if planned ahead of time.

- **Demonstrations** at local meetings are good
  preparation for a similar county-wide event. Have
  youth give demonstrations to community organi-
  zations including floriculture, nursery, and garden
  clubs, parent-teacher associations and service
groups, and to nursing and retirement homes.

- **Decision-making and judging** begin by making
  choices between two or more things and being
  able to explain the reasons for these choices.
  Making decisions based on standards of quality is
  a very useful skill. You can teach these standards
  by providing opportunities for youth to choose
  and compare products and plant materials and
  having them discuss, compare, and contrast the
  strong and weak points of each. Contact your
  county extension office for publications that deal
  with topics of interest to youngsters.

- **Discussions and problem-solving** are effective
  ways for youth to teach themselves different
  subjects, to gather experience in presenting their
  views and opinions to a group, and to learn the
  art of active listening. As a leader, you can stimu-
  late thinking and problem-solving abilities
  through many of the hands-on activities. You can
  also generate discussions by planning thoughtful
  and thought-provoking questions to youth.

- **Community service** is an integral part of 4-H.
  Sharing with others allows youth to practice
  leadership and communication skills, develop
  commitment to the community and its needs, and
  it also encourages family involvement. This
  sharing spirit will contribute to youth’s sense of
  membership in the community. Exhibits used at
  local events for parents, friends, and community
  members are an excellent way to recognize youth
  and to promote the 4-H program you conduct.
  The guide to human services in your local tele-
  phone directory can be consulted for listings of
  agencies and centers that might appreciate your
  group’s contribution. Such activities might
  include giving presentations to a health-care
  facility, senior citizen’s group, making an audio
tape for the blind, or having youth identify—activities to become involved in.

**Parental Cooperation and Involvement**

Research has shown that where parent cooperation is good we usually find good performance of the youngster in the 4-H program. Take every opportunity to bring the parents in closer contact with the 4-H program. Parents are usually ready to help in one way or another with the program. Many are waiting to be asked and you may be missing out on a valuable resource by not asking for their qualified assistance. Another old adage is that there is danger in overworking the lead horse. The solution is to work for wider participation by more parents.

**Understanding the 4-H Member**

It will help you a great deal if you will think of each youngster in your group as a different individual rather than as a group of like individuals. They have different desires to be satisfied (reasons they joined), different home situations, different abilities and capabilities, and different personalities. Only by knowing as much as possible about each individual youngster will you be in a position to be of maximum influence on them.

**Recognizing the 4-H Member**

Recognition is a basic requirement for everyone. As a leader, you are in a position to give recognition in various ways: in group meetings, during informal or home visits, and during other activities in many different ways. The old adage “When you pat the shoulder of the boy or girl, you touch the heart of the parent,” is very real in 4-H work today. As a leader, if you can visit youngsters in your group at least once during the active 4-H season and observe their projects, you will be giving a very special type of recognition that should be appreciated by both the youngster and their parents. Parental cooperation and involvement is an essential ingredient to help ensure success for the youngster.

There are many opportunities for recognition and it can come in many different forms. A warm friendly smile, a word of encouragement, a pat on the shoulder, a compliment given in public at the 4-H meeting or in front of another person, or a 4-H award ribbon. Guard against giving the 4-H member an unrealistic picture of themselves and be sure that the youngster’s recognition is for what they have accomplished. Don’t overdo giving recognition at the expense of the member and others in the club. Do keep in mind that at this developmental age, a respected adult’s opinion is highly regarded and can make a difference in the life of youngsters.

**Why Judge Horticultural Crops?**

Judging is an important step in helping 4-H members to know a good floricultural plant when they see one. Plants that have not been grown well or that have been attacked by insects and diseases will not hold up nearly as well as perfect ones in the home or at the fair. All through life people buy flowers and plants, or pick them from the garden, to give to loved ones and friends. Knowing a good flower or plant is almost as important as knowing a good vegetable or cut of meat.

**What is Horticultural Crops Judging?**

The judging of horticultural crops is grading carried to its logical termination. *Judging* is the evaluation of grading consistency and an assessment of quality. *Grading* is concerned with sorting floral materials into groups according to previously determined standards. Both grader and judge must be familiar with the standards of quality for each horticulture crop. Where quality standards are lacking, the 4-H’ers familiarity with the crop and its cultural requirements should be such as to permit his/her making valid judgments on quality.

In setting up the standards of quality which follow, an attempt has been made to reconcile perfection with commercial acceptability. Accordingly, those faults which tend to reduce commercial desirability, whether due to cultural or inherent causes, have been penalized most severely. A table of faults, in which each fault has been assigned a numerical value according to its severity, has been included for each flower. It should be understood that these placings are on a relative basis only. A score card is included to
aid the leader, or coach, in assessing the various features to be considered in judging any cut-flower class.

**Giving Oral Reasons**

Giving oral reasons can be a valuable tool in training youngsters regardless of whether they are part of the contest or not. Systematically-administered instructions on note-taking will aid the individual in organizing his/her thoughts for an accurate and substantiated decision. The four essential characteristics of a good set of reasons whether written or given orally are: accuracy, completeness, clearness, and proper emphasis.

- **Accuracy** is of first importance. This will depend on the accuracy of observations and the discrimination exercised in making comparisons. Notes should be accurately recorded.

- **Completeness** means that no important reasons for the placing are omitted. The most important aid in this will be the knowledge which the student has of important features of the class being judged and the clearness with which they keep in mind the important points and the order of their presentation.

- **Clearness** of statement is essential. A means to this end is logical organization, always following an outline, and discussing the points in systematic order.

- **Proper emphasis** means that the important differences and the more fundamental points of the individuals of the paired entries being contrasted are given the principal attention.

Long discussion of trivial points or slight differences should be avoided. Presentation of reasons can only be successful if the youngster: (1) keeps systematic notes by following the order of points for the class when writing the notes; (2) notes the important differences between individual flowers or vases, or plants of the class; and (3) delivers reasons in a manner that is clear and convincing to the judge or coach.

Consideration now will be given to the plan of exercise in which the reasons are written. These reasons necessarily must be brief because of the limitations of time and the space in which to record them. Every statement should be one of comparison. Pure description should not be indulged in because of limited time and also because the inference to be drawn from it is not always clear. Only the important differences or reasons should be mentioned and just the right word or words used to express them. Only three paragraphs should be written to state reasons.

The following plan indicates the proper organization for presentation of reasons whether written or oral.

1. State the placing of the class.
2. Reasons for placing the first over the second.
   a. State what points placed first over second.
   b. Give good points of second, or,
   c. If placing is close, give faults of second instead of advantages.
3. Reasons for placing second over third.
   a. Give admissions in favor of second placing over third, provided the differences are of considerable importance. Do not give too much emphasis on this.
   b. Give important advantages of second over third. This should constitute the main part of the reasons for this second pair.
4. Reasons for placing third over the fourth.
   a. Give admissions in favor of fourth, if any of importance.
   b. Tell the important points where the third
excels the fourth.

c. Point out outstanding faults of fourth place entry.

DEFINITION OF TERMS

- **Blemish**—Any injury due to insects, diseases, bruising, spraying, or weather (spots due to rain such as soil spattering).

- **Color**—Should be bright, clear, brilliant, uniform within the class.

- **Confused Petalage**—Two or more petals where there should be one, and petals may be crooked or malformed.

- **Crown Bud**—As defined in older literature, a crown bud forms early, usually fails to develop, and is surrounded by vegetative shoots. Morphologically it is no different than a terminal bud except that development is arrested by an environmental factor such as long days.

- **Disbud**—Buds and shoots borne in the axils of the leaves are removed before they become too large. Proper disbudding includes the removal of the peduncles of these buds also. Leaves should not be torn or removed in the process of disbudding.

- **Faulty Shape**—A flower that is not round when it should be or a spike when it should be; also, any other malformed flower. Flowers should be squarely placed on the stem.

- **Foliage**—Foliage should be clear, fresh, and a bright shade of green.

- **Immature**—In round-form flowers, one that is immature is not fully open. It, therefore, does not form a nice, round head. A spike-shaped flower that is not mature has only one or two flowers open at the bottom. A mature spike should have many flowers open without the bottom flowers having gone by.

- **Overmature**—An overmature, round-form flower will be open beyond the round head stage. The bottom petals will begin to wilt and dry. The overmature spike-form will have the bottom flowers on the spike gone by, or will be club-like
rather than spike-like.

- **Size**—Size should be uniform within the class. All vases within the class should contain five flowers. If a vase contains more or less flowers, it should be dropped to the bottom of the class.

- **Size and Proportion**—Stem and foliage should be in proportion to the size of the flower head. For example, a large, 15-inch gladiolus spike that is mature but has a tiny, thin leaf should be marked down. Stems should all be the same length.

- **Sleepy Flowers**—A condition resulting from physiological and environmental factors such as high temperature, overmaturity, ethylene gas, etc. The tops of the flower petals curl toward the center and the whole flowers appears cup-shaped or partially closed. Petals lack turgidity.

- **Split Calyx**—Splitting at junction of calyx lobes due to excess number and pressure of petals. The degree of splitting varies from a slight but short separation, to a long separation to the base of the calyx with petals extending.

  Three degrees of splitting are recognized:
  1) slight splitting of the calyx to less than one-half its length, with no resultant flower deformation, will be considered a slight fault; 2) splitting of the calyx down the vase, without flower deformation, will be considered a medium fault; 3) splitting of the calyx to any extent with the protrusion of petals, and resultant deformation of flower shape, will be considered a serious fault. Stapled splits or banded calyces are serious faults.

- **Strength and Straightness**—Stems should be straight and strong enough to support the flower heads without bending. Each stem should have only one flower in most kinds.

- **Substance**—A nice, firm, fresh, flower free from wilting.

- **Terminal Bud**—This type forms under short-day conditions and is surrounded by other flower buds. It develops normally into a mature flower usually near the same level as surrounding flowers.

- **Uniformity**—All flowers should be the same in freedom from blemishes and pest injury, freshness, size, shape, color, and straightness of stem.

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**Variety**—All flowers in a class should be of one variety. For example, if the flowers in a class of zinnias are mostly large zinnias, then a vase with dwarf zinnias in it should be put at the bottom of the class.

**SCALE OF POINTS FOR CUT FLOWERS**

(MULTIPLE SPECIMEN ENTRY)

<table>
<thead>
<tr>
<th>Condition</th>
<th>25</th>
<th>(uniformity 10*; freedom from bruise and blemish 5; substance 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>20</td>
<td>(uniformity 5*: maturity 5; correct shape 5; regular petalage 5)</td>
</tr>
<tr>
<td>Stem</td>
<td>20</td>
<td>(uniformity 5*: strength and/or straightness 5; foliage quality 5; foliage size and proportion 5)</td>
</tr>
<tr>
<td>Color</td>
<td>20</td>
<td>(uniformity 5*: intensity 5; clarity 5; trueness to variety 5.)</td>
</tr>
<tr>
<td>Size</td>
<td>15</td>
<td>(uniformity 5*: deduct points in relation to development and condition of oversize or under-size.)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

*(Note: Uniformity counts 30 points out of 100.)*

This scale makes allowance for uniformity of condition, form, etc., for the group as a whole when considering each of these qualities of the individual specimens. There is room for debate as to assigned values. Value in parenthesis ( ) refers to maximum allowed in each category.

Cut flowers can be divided into two main shapes: spike and round. The gladiolus is an example of a spike flower. The zinnia is an example of a round flower.

Spike flowers may be set up in classes such as:
1) gladiolus; 2) snapdragon; and 3) salvia.

Round flowers may be set up in classes such as:
1) zinnia; 2) marigold; 3) petunia; 4) rose; 5) chrysanthemum; 6) cosmos; and 7) aster.

**SETTING UP A CLASS OF CUT FLOWERS**

Four vases each containing five stems will make up a class. The vases will be labeled A, B, C, and D to use a convenient score sheet. The classes will be rated from excellent to poor using the Horticulture Con-
test Scoresheet detailed in the 4-H Competitive Events Handbook.

The following three examples for judging criteria will provide a base of knowledge in judging of cut flowers. The three examples are: 1) carnation; 2) chrysanthemum; and 3) gladiolus.

**Judging Considerations**

- **Flower Placement**—The flower should be borne so that the plane of the outer petals is at right angles to the stem.

- **Flower Form**—The flower should be hemispherical shaped with petals well-placed to form a full, rounded center. Preferably the outer petals should be at right angles to the median line of the calyx, forming a relatively flat base on the flower. In some varieties, the outer petals are characteristically lower than a right angle and should not be faulted. Optimum stage of openness is that in which the flower is approaching maturity with some of the center florets not fully developed.

- **Flower Petal Arrangement**—The petals should regularly overlap each other and be of similar size in each ring or row. A flower composed of concentric rings or rows as in the garden forms of Dianthus are not desirable. The size and texture of petals varies with variety; however, in a flower of any one variety, the petal size and shape should be uniform. No large, irregular voids should be present in the face of the flower.

- **Flower Calyx**—The calyx should be strong, not split, and of sufficient size to contain all lower petals. The sides of the calyx are ideally nearly parallel or slightly funnel shaped. The bracts at the base should closely adhere to the calyx.

  Three degrees of splitting are recognized: (1) slight splitting of the calyx to less than one-half its length, with no resultant flower deformation, will be considered a slight fault; (2) splitting of the calyx down to the base, without flower deformation, will be considered a medium fault; (3) splitting of the calyx to any extent with the protrusion of petals, and a resultant deformation of flower shape, will be considered a serious fault. Stapled splits or banded calyces are serious faults.

- **Stem**—The stem should be of sufficient strength to support the flower in an upright position without excessive bending. Stems should be straight. Side shoots should not be present nor evidence of recent incomplete disbudding.

- **Color**—The color of the flower should be at the
optimum stage of clarity and brilliance for the
variety. Color should be even throughout the
flower, unless the flower is naturally variegated.

• **Fragrance**—This criterion should not be consid-
ered in judging because very few carnation cultivars
are fragrant.

**Merit Checklist**

---

Hemispherical flower with a relatively flat base.

---

Plane of flower at right angles to stem.

---

Petals of uniform size and regularly overlapped
in even rings or rows.

---

Petals firm and of good substance.

---

Well-formed, strong, calyx that is not split.

---

Stem strong, straight, with no side shoots
or disbuds.

---

Leaves of good color and turgidity.

**Fault Checklist**

---

Sleepiness or other signs of maturity or post-
optimum maturity such as dark coloration of
petal tips, flaccid petals, dull faded colors.

---

Split calyx

---

Type 1—slight, has less than one-half the
length of calyx.

---

Type 2—medium, has no petals extending.

---

Type 3—serious, has petals extending.

---

Weak stems.

Irregularity of petal size and arrangement,
resulting in voids on flower faces.

Insect, disease, or mechanical injury on foliage,
flowers, or stems.

Color not optimum for variety.

Flower not open to optimum stage.

**Relative Value of Faults**

- Injury from insect pests or diseases: 10
- Sleepiness: 9
- Over-ripe, poor condition, damage: 9
- Split calyx—Type 3, poor form: 9
- Voids in flower face-poor form: 8
- Poor color for variety: 7
- Cut too tight: 7
- Split calyx—Type 2: 6
- Flower not at right angle to stem: 6
- Weak stems: 6
- Spray or water residue: 5
- Recent or faulty disbudding: 5
CHRYSANthemum—Chrysanthemum morifolium

- Short or broken stem 5
- Crooked stem 4
- Flat flower top 3
- Injured foliage 3
- Outside petals not in flat plane 1
- Split calyx—Type 1 1

Judging Considerations

- **Crown Bud**—As defined in older literature, a crown bud forms early, usually fails to develop, and is surrounded by vegetative shoots. Morphologically it is no different than a terminal bud except that development is arrested by an environmental factor such as long days.

- **Terminal Bud**—This bud type forms under short-day conditions and is surrounded by other flower buds. It develops normally into a mature flower usually near the same level as surrounding flowers.

- **Terminal Spray**—The terminal bud is surrounded by flower buds. Peduncles are not branched.

- **Crown Spray**—The terminal bud is surrounded by vegetative shoots. Peduncles are branched. The spray type may be poor or good. If the terminal flower is noticeably below the level of the other flowers, it is considered poor.

- **Clumpy Spray**—The lateral flowering branches are shortened and form a tight, elongated, poor spray.

- **Flower Type**—Spray-type chrysanthemums may have inflorescences of several types, such as: pompon, anemone, single, or decorative.

- **Spray Formation**—The arrangement of flowers in the spray will vary with variety from poor to good. General types of spray formation can be considered which will apply to all cultivars. Undesirable spray types are “poor crown,” clumpy, or loose. A terminal or acceptable crown spray is desirable. The flowers should be borne in a flat or slightly convex plane so that all flowers are visible to their fullest advantage. The center flowers of the spray should be most open with the others progressively smaller and less mature from the center of the spray outward. The center bud may or may not be present; if absent, it should have been removed.
early enough so that the stub is inconspicuous; no penalty should be assessed center bud removal if done properly. Flowers or buds which do not contribute to the spray should not be present along the stem for any distance below the spray. If these laterals have been removed, this should have been done at an early date. Broken peduncles should not be present.

*Inflorescence Form*—The inflorescence should be circular when viewed from the top.

1. *Pompon*—This inflorescence should be hemispherical in shape with the ray florets evenly spaced and arranged. The center of the inflorescence should be mounded, not flat. Few, if any disk florets should show at full maturity. The inflorescence should be circular from a top view.

2. *Anemone*—The one to five rows of outer ray florets should be arranged in a flat plane and overlapping at regular intervals. The tubular disk florets should be tightly arranged to form a prominent cushion in the center and usually of a different color from the rays. The inflorescence should be circular from a top view.

3. *Single*—The one to five rows of ray florets should be in a flat plane, evenly arranged, and overlapping at regular intervals. The simple disk florets should be conspicuous and arranged in a tight, flat cluster in the center. The inflorescence should be circular when viewed from the top.

4. *Decorative*—The outer ray florets should be evenly arranged in a flat plane and overlapping at regular intervals. The center ray florets gradually become shorter than those in the outer rows as they approach the center of the inflorescence. Few, if any, disk florets should show at full maturity.

*Foliage*—The leaves should be turgid, dark green, and of good substance. There should be no evidence of insect, disease, mechanical damage, nutritional deficiency, or improper water relations during growth. The presence of spray or water residue is considered to be a fault.

*Stem*—The stem should be straight, and of sufficient strength to hold the flower spray upright.

There should be no evidence of insect, disease, or mechanical damage.

*Flower Color*—Flower color should be typical of the cultivar with no evidence of fading. The presence of pollen is an indication of overmaturity.

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**Fault Checklist**

- Poor spray formation
- Clubby.
- Too loose.
- Irregular.
- Unacceptable crown spray.
- Many flowers not in main spray.
- Faded flowers.

Damage on flowers, foliage, or stems.

Light green foliage.

Weak or crooked.

Broken peduncles.

Flowers in poor condition, too open.

Flowers too tight.

**Relative Value of Faults**

<table>
<thead>
<tr>
<th>Fault</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury from insect pests or disease</td>
<td>10</td>
</tr>
<tr>
<td>Poor spray formation</td>
<td>9</td>
</tr>
<tr>
<td>Poor condition</td>
<td>9</td>
</tr>
<tr>
<td>Overmature infloresences</td>
<td>9</td>
</tr>
<tr>
<td>Presence of broken peduncles</td>
<td>8</td>
</tr>
<tr>
<td>Lack of uniformity among sprays</td>
<td>8</td>
</tr>
<tr>
<td>Poor order of opening</td>
<td>8</td>
</tr>
<tr>
<td>Cut too tight</td>
<td>7</td>
</tr>
<tr>
<td>Weak stem</td>
<td>6</td>
</tr>
<tr>
<td>Spray or water residue</td>
<td>5</td>
</tr>
</tbody>
</table>

---

**Merit Checklist**
GLADIOLUS—Gladiolus species

Presence of flowers or buds along stem 5
Foliage blemished or off color 5
Short stem 4
Crooked stem 3
Mechanical injury to foliage 3
Recent or faulty removal of center bud or laterals 2

Judging Considerations

- *Florets*—The petals should be turgid, not showing signs of age or damage. The basal florets should be at optimum opening, decreasing in degree of opening to a colored bud located approximately one-third the distance from the top of the flower spike. There should be no streaking of petals due to thrip damage, or dried bracts (sheath) around buds.

- *Floret Spacing*—The florets should be evenly spaced in the spike without any apparent spaces between.

- *Floret Facing*—All florets should face in approximately the same direction.

- *Foliage*—The leaves should be turgid, dark green, and not extend above the basal floret. There should be no tip burn or any evidence of thrip injury.

- *Stem*—The stem should be straight and strong and the tip of the flower spike should not be bent or broken. There should be no side shoots present.

- *Flower Color*—The color of the florets should be typical of the variety and similar to all florets on the spike.

- *Flower Spike*—The flower spike should not be less than one-third of the total length of the stem.

Merit Checklist
Two-thirds of the florets open and in good condition.
Florets open progressively from full open florets at base to buds at top of spike.
All florets face the same direction.
Strong, straight stem.
Leaves dark green with no damage.
Florets evenly spaced on spike.

Fault Checklist
Florets show signs of age: discolored, flaccid.
Florets too tight.
Stem bent at tip.
Florets face different directions.
Florets unevenly spaced.
Florets not progressively smaller from base to top of flower spike.
Presence of thrip injury on florets or foliage.
Presence of leaf tip burns.
Foliage extending above basal florets.

Relative Value of Faults
- Injury from insect pest or disease: 10
- Poor condition or overmaturity: 9
- Stem tip broken: 9
- Poor facing: 8
- Flower spike less than one-third total stem length: 7
- Poor spacing: 7
- Poor stage or progression of opening: 7
- Missing florets: 7
- Off-color florets: 6
**Judging Example**

**Potted Flowering Plants**

<table>
<thead>
<tr>
<th>Damage Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crooked stem</td>
<td>6</td>
</tr>
<tr>
<td>Mechanical damage to flowers</td>
<td>5</td>
</tr>
<tr>
<td>Cut too tight</td>
<td>5</td>
</tr>
<tr>
<td>Foliage extending above basal florets</td>
<td>4</td>
</tr>
<tr>
<td>Stem tip bent</td>
<td>3</td>
</tr>
<tr>
<td>Presence of side shoots</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical injury to foliage</td>
<td>2</td>
</tr>
<tr>
<td>Leaf tip damage</td>
<td>1</td>
</tr>
</tbody>
</table>

**Definition of Terms**

- **Color of Bloom**—The flower should be clear, bright, and fairly uniform. They should not be faded.

- **Color of Foliage**—Foliage should be a good bright green. It should not be yellow or dried.

- **Cultural Perfection**—Plant should have a good shade of color typical to the variety. The soil should be loose and not caked. The plant should not be one-sided where it faced the light. It must not be leggy or rank in growth. Soil should be level in pot, from 1/4 to 1/2 inch below pot rim.

- **Floriferousness**—The flowering plants should be in bloom with as many flowers as the plant can support. The open flowers should be mature with plenty of immature flowers coming along. No overmature flowers should be on the plant.

- **Plant**—As used in commercial practice, a plant shall consist of one pot containing 1 to 8 individual plants so planted and grown as to produce the effect of one plant. For contest purpose, each pot must contain the same number of plants.

- **Size of Bloom**—Flowers should be as large as possible for the variety. You should not expect a dwarf geranium to be as large as a standard ger-
mium flower, however.

**Size of Foliage**—On nonflowering plants, the foliage should be large, well-formed and neatly arranged on the stem since the plant is grown only for its foliage.

**Size of Plant**—The plant should be as large as possible without looking top-heavy in the pot. It should not be squatty. The plant should be twice the size of the pot.

### SCALE OF POINTS FOR POTTED FLOWERING PLANTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural perfection</td>
<td>40</td>
</tr>
<tr>
<td>Floriferousness (effect of floriferousness)</td>
<td>20</td>
</tr>
<tr>
<td>Size of plant</td>
<td>20</td>
</tr>
<tr>
<td>Color of bloom</td>
<td>10</td>
</tr>
<tr>
<td>Size of bloom</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

### SETTING UP A CLASS OF POTTED FLOWERING PLANTS

Several classes of potted flowering plants may be judged. A good listing of potential plants for judging
would be the identification lists from the Horticulture Contest detailed in the 4-H Competitive Events Handbook.

Each class will have four potted plants in it. They will be labeled A, B, C, and D.

The following two examples for judging criteria will provide a basic knowledge in judging flowering potted plants. The two examples are 1) chrysanthemum, and 2) geranium.

CHRYSANTEMUM—Chrysanthemum morifolium

Judging Considerations

Cultural Perfection—The term relates to the physical appearance of the plant as witness to the skill of the grower. In general, the points a judge should look for are the following:

- **Good balance** between the sizes of plant and pot. The plant which is either too small or overlarge for its container is not a good commercial specimen. The pot should be full enough to prevent the appearance of legginess.

- **Shape** of the plant will vary according to variety and the number of individual plants composing the specimen. In general, the plant should be symmetrical, compact, well-furnished with foliage to the base, and have slightly rounded head, permitting maximum distribution of the flowers. The plant should give a good appearance from all sides. It should form a regular circle as seen from above.

- **Foliage** should have good color, giving no evidence of nutritional deficiencies, disease, and/or insect damage, spray residues, and mechanical injury. In addition, aged foliage at the base of the stem should be at the minimum, and dead or malformed leaves should be removed.

- **Stems** should be of uniform length and well-spaced, contributing to the shape of the plant and the floral display. They should be strong enough to support the flower or floral spray. Willowy or weak stems which require staking are either varietal faults or indicate poor cultural methods.

- **Flowers** should be uniform in development. The desired stage of development is approaching full maturity without showing an open center. Hard, green centers, mechanical damage due to poor handling, careless or poorly-timed disbudding are faults, as are evidences of spray residues or injury by insects or disease. There should be no evidence
of recent or incomplete disbudding.

---

**Merit Checklist**

- Compact, symmetrical plants, preferably 15 to 18 inches high.
- Foliage dark green and turgid.
- Floral display slightly rounded.
- Individual flowers uniform in development, well-spaced, not crowded, well-colored.
- Stems strong enough to hold flowers erect.

---

**Fault Checklist**

- Poor floral display:
  - Too crowded
  - Too loose
  - Irregular level of flowers
  - Voids resulting in lack of symmetry
- Faded flowers
- Poor development of centers or lopsidedness of individual flowers

- Damage to flowers, stems, and foliage by disease or insects
- Mechanical injury to flowers, stems and foliage
- Evidence of wiring to strengthen stems and support blooms
- Weak or willowy stems
- Legginess of plant
- Careless or poorly-timed disbudding.
- Nonuniform development of stem and flower.
- Failure to disbud.

---

**Relative Value of Faults**

- Injury from insect pests or disease 10
- Poor proportion of plant to pot 10
- Poor condition of flowers and foliage 9
- Poor plant shape 9
- Wired stems 8
- Presence of broken peduncles 8
- Poor floral display (too crowded, poorly distributed around plant) 7
GERANIUM—Pelargonium species

Nonuniform flower development 7
Poor development of centers or
lopsidedness of individual flowers
or flower sprays 6
Leggy plants 6
Spray or water residue 5
Plants too short 5
Flowers not in proportion to plant 4
Recent or faulty disbudding 3
Minor mechanical damage to foliage 1

Judging Considerations

▲ The Plant—In all cases, the plant should be symmetrical and vigorous. Geraniums are usually
classified under three categories or types:

Pelargonium x hortorum is the garden or zonal
geranium used primarily in the commercial floriculture industry.

Pelargonium x domesticum is the Martha (Lady)
Washington geranium.

Pelargonium x peltatum is the ivy geranium which
is a trailing type.

▲ Containers—The plants should be in proper
proportion to the container and should look stable
with the plant about twice the size of the pot.
Plants should be grouped for judging in two
groups by size: (1) 4-inch pot, and (2) over 4-inch
pot; and they should be grouped separately as:
self-branching, pinched, and trailing (ivy types).

▲ Floriferousness—Refers not only to the number of
flowers in good condition at the time of judging,
displayed by the specimen, but also to the effect of
flowers. A smaller number of flowers so spaced as
to permit their maximum development without
crowding is more desirable than a large number of
flowers crowded into a tight, confused floral
display.

▲ Size of Plant—The size of the plant should be in
Proportion to the size of the pot in which exhibited, but not so large as to be top-heavy.

**Size of Flowers**—The judge should consider the size of the individual flowers and their uniformity. The individual flowers should be as large as varietal characteristics will permit without being coarse.

**Color of the Flowers**—The color should be fresh, bright, and giving no evidence of fading or browning at the “petal” edges, free from blemishes, and true to variety.

**Flowers**—Flowers should make an abundant, showy display and should count more than foliage. The flower heads should extend about two inches above the foliage with bud clusters coming out in a symmetrical pattern from the plant. The pedicels should not be elongated to give a naked stem appearance, nor should they be so short as to cause the flowers to be hidden by foliage. The individual flowers in the inflorescence should be uniform, with no blemishes, and show no signs of aging. Single- and double-flowered plants should be the same color. (Popularity is approximately 65 to 70 percent red, 30 to 35 percent pink and salmon, and 5 percent white.) Color intensity of the variety is important. It should be clear, intense, and uniform.

**Foliage**—The foliage should be abundant to clothe the plant and hide the stems. It should be of lustrous dark green leaves free from spray residue, insect and disease pests, or mechanical injury. Zonal markings in the leaves with reddish color and rings are a varietal characteristic and should not be faulted, unless irregular in design.

---

**Merit Checklist**

--- Flower and bud potential almost equal to one-third leaf area.

--- Proper size of leaves.

--- Proper proportion of plant to pot.

--- Abundant dark green foliage.

--- Symmetrical plant form.

--- Preferably 10 to 15 inches tall.

--- Resistance to disease and heat damage.

--- Clear, intense flower color.

--- Flowers borne above the foliage.

--- Uniformity of individual flowers.

--- Fault Checklist

--- Lack of symmetry.

--- Elongated flower pedicels.

--- Faded flowers.

--- Flowers hidden by foliage.

--- Plant in poor proportion to pot. Too short or too tall.

--- Poor foliage (chlorotic, spray residue, presence of disease, especially botrytis).

--- Individual flowers not uniform in size.

--- Heat damage.

--- Single and double-flowered plants in same class.

--- (Odd one goes to bottom)

--- Irregular zonal markings on foliage.

--- Flowers water spotted.

--- **Relative Value of Faults**

<table>
<thead>
<tr>
<th>Fault Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury from insect pests or disease</td>
<td>10</td>
</tr>
<tr>
<td>Poor plant shape</td>
<td>10</td>
</tr>
<tr>
<td>Lack of symmetry</td>
<td>9</td>
</tr>
<tr>
<td>Poor ratio of flowers to foliage</td>
<td>9</td>
</tr>
<tr>
<td>Plant too small for pot</td>
<td>9</td>
</tr>
<tr>
<td>Plant too large for pot</td>
<td>8</td>
</tr>
<tr>
<td>Elongated pedicels</td>
<td>8</td>
</tr>
<tr>
<td>Flowers failing to clear foliage (short pedicels)</td>
<td>8</td>
</tr>
<tr>
<td>Flowers poorly distributed around plant</td>
<td>7</td>
</tr>
</tbody>
</table>
JUDGING
EXAMPLE

POTTED FOLIAGE PLANTS

Sparse foliage 6
Water spotted flowers 6
Faded flowers 5
Poor foliage condition or coverage 5
Spray or water residue 4
Improper height 4
Heat damage 3
Lack of uniformity in individual flower size 2
Irregular zonal markings 2

DEFINITION OF TERMS

Plant—As used in commercial practice, a plant shall consist of one pot containing 1 to 8 individual plants so planted and grown as to produce the effect of one plant. For contest purposes, each pot must contain the same number of plants.

Foliage Plant—Any plant produced in a commercial greenhouse, or similar structure, for its beauty of foliage and shape.

Size—Size is only a relative matter because some specimens growing in their native habitat may reach 100 inches in height (Ficus elastica).

For other pertinent definitions, see sections on Cut-flower Chrysanthemum.
SCALE OF POINTS FOR POTTED FOLIAGE PLANTS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural perfection</td>
<td>60</td>
</tr>
<tr>
<td>Size of plant</td>
<td>20</td>
</tr>
<tr>
<td>Size of foliage</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

SETTING UP A CLASS OF POTTED FOLIAGE PLANTS

Each class will have four potted plants in it. They will be labeled A, B, C, and D.

PLANTS TO JUDGE

Several classes of potted foliage plants may be judged. A good listing of potential plants for judging would be the identification lists from the Horticulture Contest detailed in the 4-H Competitive Events Handbook.

Judging Considerations

**Cultural Perfection**—The physical appearance of the plant should clearly indicate the skill of the grower. There should be a proper balance between the size of the plant and container. A plant which is either too small or too large for its container is not a good commercial specimen. The plant which is too small for its container should be more severely faulted than the plant which is too large.

**Upright Type Form**—The shape of the plant will vary according to variety or type but, in general, it should be compact, symmetrical, and well-furnished with foliage from the top of the pot to its full height. The plant should preferably, for most types, give a good appearance from all sides. This may not be feasible for some types such as split-leaf philodendrons (*Monstera deliciosa*) and others trained on poles of fern or bark, but definitely so in the case of Boston fern (*Nephrolepis exaltata* Bostoniensis). The stem or stems should be sufficient size and strength to properly support the plant from ground level to top. Special support such as bamboo, osmunda fern pole, or sphagnum may be placed with the plant if it is of the type which can use and is enhanced by such support.

**Trailing Type Form**—Certain foliage plants such as ivy (*Hedera helix*) and certain philodendrons (*Philodendron scandens oxycardium*) have a trailing habit of growth. Therefore, they need a slight variation in judging characteristics as compared to the upright types.
- **Foliage**—Since the leaves, in general, are the most effective part of the plant, they must be given considerable attention and “weight.” The foliage should be clean, have good color and sheen, giving no evidence of nutritional deficiencies, spray, sheen, or water residues, and insect, disease, or mechanical injury. The size and number of leaves should be commensurate with the variety or kind of plant, and should be sufficient to fully “clothe” the plant without leaving any gaps in the foliage cover. The foliage should give the appearance of continued and vigorous growth. Foliage polishes may be used to clean and brighten the leaves.

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### Merit Checklist

- Correct form for variety of plants.
- Symmetry of form.
- Proper proportion of plant to pot.
- Strong and proportionate stem or stems.
- Abundant glossy, green foliage.
- Bright, clear, and vivid colored foliage for colored foliage type plants.
- Foliage free of insects and/or disease damage.
- Foliage abundant, vigorous, and free from residues and mechanical damage.
- Support pole of good character and scale.
- Flowers are not an advantage.

---

### Fault Checklist

- Poor form for the variety of plant.
- Lack of symmetry.
- Plant too large or too small for pot.
- Weak stem or stems.
- Sparse foliage.
- Foliage dull and “off color.”
- Blemished foliage.
- Disease or insect damage present.
- Improper support.

### Relative Value of Faults

<table>
<thead>
<tr>
<th>Fault Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury from insect pests or disease</td>
<td>10</td>
</tr>
<tr>
<td>Poor shape for the variety of plant</td>
<td>10</td>
</tr>
<tr>
<td>Lack of symmetry</td>
<td>9</td>
</tr>
<tr>
<td>Poor facing of round plants</td>
<td>9</td>
</tr>
<tr>
<td>Sparse or off-color foliage</td>
<td>9</td>
</tr>
</tbody>
</table>

---

### Common Faults of Plants

- **Gladiolus**—Crooked stem, bottom flowers gone by, flowers not placed properly on the stem, two spikes on a stem, streaked foliage (indicates thrips or virus).

- **Snapdragon**—Same as for gladiolus except that foliage doesn’t streak.

- **Salvia**—Crooked stems, faded flowers, overmature flowers, foliage not bright green, more than one spike on a stem.

- **Zinnia**—Overmature or undermature, more than one color in a vase, mildew or insect damage on foliage, crooked stem, flower heads too large for stem.

- **Marigold**—Same as for zinnia, plus split calyx.

- **Petunia**—Flowers blemished, gone by flower stem on main stem, spotted foliage, more than one variety in a vase. It is all right to have more than one flower on a stem.

- **Rose**—Same as for zinnia plus poor color. It is hard to get good uniform color in roses.

- **Chrysanthemum**—Same as for zinnia.

- **Aster**—Same as for zinnia.

- **African Violet**—More than one crown to the pot.

- **Geranium**—Poor plant shape, bottom leaves missing, leggy.

- **Begonia**—Same as for geranium.

- **Nonflowering Plants**—Too few leaves, leaves small, poor shape, overgrown, and plant shows lack of fertilizer (not a good green).
IDENTIFICATION LIST

GARDEN FLOWERS

» Ageratum (Ageratum houstonianum). Ageratum is a popular, low-growing, annual plant of flower gardens. It varies in size from the very dwarf, compact type hardly more than 3 inches high, to the tall, branching varieties which often reach a height of 18 inches. Its pale blue, white, or pink flowers bloom all summer. Each flower head of the ageratum consists of many tiny, tube-shaped, closely crowded flowers.

» Alyssum–Sweet (Lobularia maritima). Sweet alyssum is a low, spreading, hardy plant of the mustard family. It has clusters of tiny flowers, white or yellow, and sometimes rose that persist until late in the fall. Some of the plants are dwarfed, and others grow to 10 inches high. Stems have a bitter juice.

» Amaryllis (Amaryllis belladonna). Amaryllis is a family of more than 1,300 species of flowers. Most members of the amaryllis family grow outdoors in the warm regions of the world. In colder climates, they are usually grown indoors as potted plants. The foliage which develops at the base of the plant is made up of many long, narrow leaves. The blooms of the amaryllis are borne on tall, straight flower stalks high above the foliage, and sometimes are confused with those of the lily. The flowers of the American-grown strains are trumpet shaped, and vary greatly in size according to the variety and the culture which they receive. Some individual blooms measure 12 inches across. Dutch strains have “pancy-faced” blooms.

» Aster–China (Callistephus chinensis). Many narrow leaves are arranged alternately on the stem. Flowers on long stems are similar in shape to chrysanthemums and may be white, pink, red, or blue. Plants grow from 6 to 36 inches tall, depending on the cultivar.
**Bachelor’s Button (Centaurea cyanus)**. Bachelor Button is the name given to many small European flowers which look like buttons. They are usually pink, white, or purple in color. The flowers are both single and double and sometimes plume—or pompon-like. Bachelor’s Button is very hardy and will thrive under ordinary conditions in any good garden soil with a sunny location.

**Balsam (Impatiens balsamina)**. Leaves are dark green, long, and narrow, have toothed edges, and grow from 1 1/2 to 6 inches long. Flowers most frequently occur as doubles 2 inches in diameter and may be pink, red, white, or purple.

**Begonia–Tuberous-Rooted (Begonia tuberhybrida)**. The tuberous-rooted begonia is among the most beautiful and most decorative of flowering plants. It is often spoken of as the "mockingbird flower" because of its widely varied forms and its unusually beautiful shades of pink, salmon, apricot and orange; brilliant scarlets, crimsons and deep reds; pure glistening white, and pale yellow. The flowers have a waxy appearance. The leaves sometimes are tinted with shades of red, yellow, or white. These plants have an exceptionally long flowering period. The individual blossoms range from a gratifying 3-inch diameter to an incredible 8 inches.

**Begonia–Wax (Begonia semperflorens-cutorum)**. The wax begonias are considered fibrous-rooted, everblooming begonias. They are brilliant-flowered and very tender annuals. Their colors range from white to coral red and all colors in between. Their varieties include Christmas Cheer, Christmas Pink, Luminosa, King of the Reds and others. Male and female flowers are borne separately in the same cluster.

**Bells of Ireland (Molucella laevis)**. Flowers are green and bell-shaped, growing at intervals on the stem in groups of six. Each of the flowers in these groups grow around the stem at 90-degree angles to each other. Plants grow to 2 feet tall.
**Calendula (Pot marigolds) (Calendula officinalis).** Leaves are oblong and toothed. Flowers may be yellow or orange and are in the form of powder puffs about 2 1/2 to 4 1/2 inches in diameter.

**Candytuft (Iberis umbellata).** Leaves are short, oblong, and arranged vertically on the stem. Flowers may be pink or violet and occur in dense clusters. Plants are dense and compact, reaching 1 1/2 to 2 feet tall when mature.

**China Pink (Dianthus spp. and hybrids).** Narrow leaves occur opposite one another on the stem. They grow from 1 to 3 inches long, are about 1/2 inches wide, and have pubescent margins. Flowers grow in clusters and may be red, white, or pink.

**Cockscomb (Celosia argentea cristata).** There are two main natural classes of these exotic flowers. The first one, whose individually small blossoms are massed in curiously formal, distorted patterns suggestive of a cock’s comb or crest, is the reason for the whole group’s popular name. In true garden talk these fowl-like fellows are referred to as the Crested Cockscombs. The second is quite different in appearance and is characterized by feathery or plummy flower masses.

**Cockscomb (plume) (Celosia cristata plumosa).** Leaves are long, about 2 inches, and narrow and may be lobed. Plume-shaped flowers may be red or yellow.

**Coleus (Coleus spp.).** Coleus plants are annual or perennial herbs of the mint family. They have brilliantly variegated foliage that surpasses other garden plants for color. The luxuriant foliage may be maroon, green, crimson, yellow, or combinations of these colors.
Columbine (*Aquilegia* spp.). The common wild columbine bears red and yellow nodding flowers on rigid, slender stems. Each blossom has five long-spurred petals and many large stamens. The primary feature that distinguishes the columbines from all other flowers are the long, slender, graceful spurs. The spurs are five in number and often reach a length of 4 inches. The tip of each spur has a drop of clear, sweet nectar which is eagerly sought by bees and hummingbirds.

Cosmos (*Cosmos sulphureus*). Cosmos is one of the world’s daintiest and most refined flowering plants, in both growth and structure, as well as actual blossoms. It is a tall, feathery-leaved, garden flower that was brought to the United States from Mexico. When mature the height ranges from 3 to 6 feet. It is a relative of the sunflower. Cosmos flowers range from white and pink to red and yellow. Some of their blossoms are 5 or more inches in diameter and are poised on slender, graceful stems.

Crocus (*Crocus susianus*). Crocus is a flowering herb-like plant that grows in southern Europe and Asia, and is cultivated in many regions of the world. The crocus plant grows from a thick bulb-like stem called a corm. The leaves look like large leaves of grass. Crocus flowers grow at ground level. Each blossom is made up of six nearly equal segments, and has three stamens and a pistil. Probably the most popular crocuses are the purple and cloth-of-gold, a brilliant orange-yellow.

Daffodil (*Narcissus pseudonarcissus*). The daffodil is a yellow flower that blooms in early spring. There are many kinds of daffodils, the best know is called the “trumpet narcissus.” They have a very large, single blossom at the end of each stalk and five or six bluish-green leaves about 15 inches long on each stalk. The daffodil has a yellow, tube-shaped flower with a fluted edge. Delicate petals of varying shades of yellow grow at the base of these spring flowers.
**Garden Flowers**

- Dahlia (*Dahlia variabilis* and *Dahlia juaezi*). Modern cultivated dahlias outrank all other flowers in the variety of their sizes, forms, colors, effects, and uses. Among them are huge “cabbages” more than a foot wide and correspondingly thick and heavy; the plants which produce them may be 6 feet tall. At the opposite end of the scale are little “bushes” whose trim blooms suggest miniature, many colored, golf balls. Between these extremes are broad petals, narrow petals, petals that curl, and petals so tightly rolled they resemble thin pencils. Throughout the whole size range are tousled blooms, uprights and floppies, geometricals, and fancifuls. Dahlias grow from tuberous or thick fleshy roots that look somewhat like bulbs.

- Daylily (*Hemerocallis spp.*). Flowers open for one day only, then die. Flowers have two rows of three petals, are trumpet-shaped, and come in yellow, orange, pink, and red shades. There are usually three to five flowers per stalk, opening one at a time. Leaves are very long and narrow, folded down the center, and rise from the ground in a fan-shape.

- Delphinium (*Delphinium*). Larkspur is a popular name for the delphinium. Gardeners usually give the name larkspur to the annual flowers in this or the wild woodland species. The perennial garden flowers are called delphinium. Delphiniums range in height from 8 to 10 inches to as much as 6 feet or more. Many delphiniums have comparatively scanty foliage, and it appears their overwhelming objective is for flower production. The flower spikes are broad at the base and taper toward the tip, the blooms being clustered closely along the stem.

- Flowering Tobacco (*Nicotiana alata*). Leaves often grow to 10 inches long. Star shaped flowers grow on long stems. They may be pink, red, or white.
Geranium (*Pelargonium hortorum*). The geranium is a plant native to South America and Australia, but is widely grown in the United States. Many forms of geraniums have been developed. The plants vary in the size and color of their flowers and texture of their leaves. The geranium has attractive leaves that usually are shaped like a heart. The red, white, or pink flowers grow in ball-like clusters at the end of the plant stems.

Gladiolus (*Gladiolus hortulanus*). The gladiolus is a garden plant with spikes of large silky flowers that are popular in vases and displays. The flower colors range through all the shades of red and orange to the simplicity of white. The tube-shaped flowers grow above one another in long clusters along one side of the stem, the lower blossoms opening first. Gladioloi have tall, slender iris-like steps and long, sword-shaped leaves.

Globe Amaranth (*Gomphrena globosa*). Oblong leaves grow in elliptical units. They are pubescent and may be 2 to 4 inches long when mature. Leaves have pubescent margins. Flowers may be red, pink, or white and have 1-inch diameters.

Hyacinth (*Hyacinthus orientalis*). Hyacinth is a favorite spring flower of the lily family. It produces fragrant small pillars of bloom. The flower stalks range in height from 6 to 18 inches. There are blues, reds, pinks, and yellows in amazing variety. Single flowers and doubles are numerous, too, and their impacts when in bloom are quite different. Hyacinths grow from bulbs in open beds, hot-houses, and in the home. When raised in the open they need rich, well-drained soil. The bulbs are planted between September and November.

Hyacinth–Grape (*Muscari botryoides*). The so-called Grape Hyacinth is not a real hyacinth although it groups its numerous little blossoms in a somewhat club-like head. Its charming tiny blue or white bell-shaped flowers in spike-like racemes appear very early in the spring. The spikes range in height from 4 to 8 inches.
**Garden Flowers**

- **Impatiens (Patient plant) (Impatiens wallerana).** Leaves are elliptical. Open-faced flowers may be red, pink, or orange, and have 1-inch diameters.

- **Iris (Iris spp.).** The iris is a popular plant with large, beautifully colored flowers. The unusual shape of the iris sets it apart from other flowers and makes it easy to recognize. It has three sets of triple petal-like parts. The lower set, called the falls, flares out and hangs down; three upper segments curve up into a dome, and are known as standards. Three curved style-branches cover the stamens in the center. The colors range through all shades, appearing in attractive combinations, blends, and two-toned effects. The plant may grow from 6 inches to over 6 feet tall. The flowers vary from an inch to over a foot in diameter. The leaves rise directly from the roots.

- **Lobelia (Lobelia erinus).** Ovate, toothed leaves are arranged both alternately on the stem and in rosettes. Flowers grow on long stems, are 1/2 inch in diameter, and may be blue or violet.

- **Marigold, African (Tagetes erecta).** Leaves are pinnate, opposite, and have a distinct scent. Flowers are large and showy and may be white, red, or orange. Flower and leave size varies with cultivar.

- **Marigold, French (small flowered) (Tagetes patula).** French marigolds are similar to African marigolds, except they have smaller flowers and a spicy fragrance.

- **Morning Glory (Ipomoea purpurea).** Morning glory is the name of a family made up mainly of climbing plants. The morning glory grows rapidly, and twines about nearby objects. It grows from 10 to 20 feet high and is widely used as a covering for posts, fences, and porches. It has dark green leaves shaped like a heart. The flowers are shaped like a funnel and are of various shades and mixtures of purple, blue, red, pink, and white. The fragrant flowers open in the morning, but close in the sunlight later in the day.
**Nasturtium (Tropaeolum majus).** The nasturtium is a trailing or climbing annual that may climb to a height of about 10 feet. Its brightly colored blossoms, in yellow, orange, or red, are attractive in flower beds or as cut flowers. The nasturtium flower has five small sepals (outer “petals”). The three upper ones form a long spur that holds the nectar. There are also five petals. The two lower petals are a little apart from the upper three and have long, fringed claws. The long, stalked leaves are shaped like an umbrella. They have a spicy taste and are sometimes used in salads. The leaves also make an attractive light green background for the bright flowers.

**Painted Tongue (Salpiglossis sinuata).** Leaves may have wavy margins or small teeth. Scarlet, blue, or yellow flowers grow on narrow stems. Plants grow to 3 feet tall.

**Pansy (Viola wittrockiana).** Pansy, the “flower with a face,” is a cultivated violet. The beautiful flowers of the pansy may be purple, violet, blue, yellow, white, brown, or any mixture of these colors. The pansy, a hardy, low-growing flower that can be easily grown in the home garden, requires plentiful water and little sun. Some pansies live only one season; others are perennials.

**Peony (Paeonia officinalis).** Peony is the common name of a group of plants with large, handsome flowers. In early spring, peonies have shrubby or herb-like stems. The clusters of leafy shoots, red and shiny green in appearance, make striking effect a few weeks before the flowers appear in large spring or early summer. The large flowers of the common peony are usually white, pink, or red, and do not have much fragrance. Its showy flowers grow on a stalk from 3 to 4 feet high.

**Petunia (Petunia hybrida).** Petunias are cultivated widely as annual garden flowers. The petunia plant is covered with tiny hairs. It has beautiful funnel-shaped flowers which are large and velvety. Most petunias are perennials, but are usually grown as annuals since they flower during the first year of growth. They thrive in a sunny location. There are single and double, fringed, and plain-petaled cultivars and some have flowers up to 5 inches across. The colors vary from pure white to deep violet reds; some are striped, many are fringed, and one improved form has clearly defined five-pointed, star-like markings.
Phlox, Annual (*Phlox drummondii*). Fern-like leaves grow bushy at the base of the plant. Flowers occur in clusters and may be lilac, purple, or pink.

Portulaca (*Portulaca grandiflora*). Portulaca is the name of a group of herbs with dainty red, yellow, pink, white, or purple flowers. The common name is rose moss. It grows flat or to about 1 foot in height with narrow, fleshy leaves about 1-inch long. Portulacas make beautiful plants for a border or a rock garden. They grow best in poor, rather light soil and should be given a sunny exposed position. The flowers open only in full sun.

Rose (*Rosa spp.*). Flower experts recognize two main classes of cultivated roses: those that bloom once a year, usually in early summer, and those that bloom more than once in a single season. The rose family has about 2,000 species of trees, shrubs, and herbs. Its members include the apple, pear, quince, berries, peach, apricot, plum, cherry, meadowsweet, mountain ash, and hawthorn. Stems of the rose plant are usually thorny. Cultivated roses usually have more than one circle of petals and sometimes have cabbage-shaped bodies.

Salvia (Scarlet sage) (*Salvia splendens*). Herbaceous annual usually has square stems. Oval leaves occur in pairs, are pubescent, and toothed. Flowers are plume-shaped and occur in clusters. Plants may grow to 3 feet high.

Snapdragon (*Antirrhinum majus*). The snapdragon is a hardy, colorful plant with flowers that look like an animal’s head. Each blossom has two lips that open like jaws when the sides of the blossom are pressed. When the pressure is released, the lips snap shut again. The velvety flowers come in many colors. Tall cultivars of snapdragons often grow 4 feet high. Dwarf cultivars may reach a height of 9 inches.
Statice, Annual (Sea lavender) (*Limonium sinuatum*). Leaves are arranged both alternately on stems and in rosettes. Flowers occur in clusters and may be blue, lavender, rose, or white.

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Strawflower (single, double) (*Helichrysum bracteatum*). Oblong leaves grow to long lengths. Yellow, red, salmon, or white flowers grow to 2 inches in diameter.

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Sunflower (single, double) (*Helianthus annuus*). Large, round leaves occur alternately on the stem. Yellow, daisy-like flowers grow to 10 inches in diameter.

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Tulip (*Tulipa gesneriana*). The tulip blooms in the spring. The leaves and flower stems of tulips grow directly out of the bulb. The stem usually grows more than 2 feet high, but in some dwarf cultivars the stem is about 3 inches tall. The tulip usually develops only one large, bell-shaped flower at the tip of its stem that may be either single or double, usually grows erect on the stem, and may be almost any color.

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Verbena (*Verbena x hybrida*). Leaves are lobed and toothed. Flowers occur in clusters and may be lilac, purple, red, or white. Plants grow from 10 to 18 inches long.

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Vinca (*Vinca*). Foliage is elliptical and dark green. Flowers are flat and have five petals. They come in many different colors including pink, white, and red. Flowers grow on trailing vines.

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Wishbone Flower (*Torenia fournieri*). Leaves are oval. Flowers are blue with purple markings, occur in clusters, and are 1 inch in diameter. Plants grow to 1 foot tall.
IDENTIFICATION LIST

FLOWERING POTTED PLANTS

- **African Violet** (*Saintpaulia ionantha*). It grows from 3 to 5 inches tall. The flowers, alone or in clusters on slender stalks, measure about 1 1/2 inches across and range in color from white to vivid blue or violet. The hairy, oval leaves grow on long stalks.

- **Azalea** (*Rhododendron hybrids*). Azaleas produce 1-inch to 4-inch blossoms that are red, pink, white, or multicolored. Plants grow from 6 inches to 2 feet tall, depending on variety.

- **Calceolaria** (*Calceolaria crenatiflora*). Calceolaria is often called the pocketbook plant because its flowers resemble small pocket books. Blossoms form small pockets and grow to 2 inches wide. They may be red, pink, maroon, bronze, or yellow with red, brown, or purple spots. Leaves range from light to dark green in color and reach 6 inches when mature.

- **Cape primrose** (*Streptocarpus x hybridus*). Flowers are trumpet-like and grow from 2 to 5 inches long. They may be white, pink, rose, red, blue, or purple in color, have frilly edges, and may have contrasting colors. Leaves are narrow, stemless, pubescent, and form into rosettes that are 10 to 20 inches in diameter.

- **Cineraria** (*Senecio x hybridus*). Cineraria produce large clusters of daisy-like flowers. Flowers may grow from 1 to 4 inches in diameter and may be white, pink, red, blue, or purple with white or blue centers. Some may have rings, contrasting in color, that circle their centers. Leaves form a dense crown and grow from 1 to 4 inches long when mature.
FLOWERING POTTED PLANTS

❖ Christmas Cactus (Schlumbergia bridgesii). These plants are regular air-plants and grow on trees along with many kinds of orchids. In the United States, however, they are almost always grown in pots and kept in the house or a greenhouse during the winter, with perhaps an outdoor summer vacation. If all goes well, they start flowering about Christmas time, thereby justifying their popular name. Some people call them Crab Cacti because of the oddly jointed, flattened, glossy sections of their stems. The drooping branches are tipped with handsome red, sometimes double flowers.

❖ Chrysanthemum (Chrysanthemum spp.). The chrysanthemum is a strong-scented shrubby herb that grows in many temperate regions of the world. Gardeners cultivate the plants for their beautiful and abundant blossoms, which usually appear in autumn. Chrysanthemum blossoms vary greatly in size. Some grow no larger than a button; others may be 8 inches in diameter. Some chrysanthemum blossoms look like daisies; they have a central disk from which petals ray outward.

❖ Easter Lily (Lilium longiflorum eximium). The Easter lily flower has become a sentimental symbol of Easter. It is a tall plant with long, pointed leaves. The large, fragrant, waxy, flowers are white and are shaped like a trumpet.

❖ Exacum or Persian Violet (Exacum affine). Persian violets reach the height of 6 to 8 inches when mature. They produce fragrant, 1/2-inch diameter, daisy-like, blue flowers with large yellow pollen in the center. Leaves are heart shaped and an inch long when mature.

❖ Florist’s Cyclamen (Cyclamen persicum). Cyclamen plants grow to 6 inches high. They produce 2-to 3-inch flowers that may be pink, red, or white. Dark green leaves form a thick crown of foliage. Leaves often have silvery markings.
Flowering Potted Plants

❖ Gloxinia (Sinningia speciosa). The flowers of gloxinia are velvety, bell-shaped, have five petals, and may be white, pink, deep red, lavender, or purple. They may have contrasting colors within their petals. Leaves are oval and grow to 5 inches long.

❖ Kalanchoe (Kalanchoe blossfeldiana). Kalanchoe have waxy leaves 1 to 2 inches long. Flower blossoms are red or yellow, have four petals, and diameters of 1/4 to 1/2 inch. Plants often grow to one foot tall.

❖ Poinsettia (Euphorbia pulcherrima). The poinsettia has tiny flowers surrounded by large, colored bracts or special leaves. The bracts are usually bright red, but may also be yellowish or white. The brilliant red bracts contrast with the green leaves, and make the poinsettia popular for decoration during the Christmas season. As a potted plant, it grows from 1 to 4 feet tall.

❖ Primrose (Primula vulgaris, P. obconia ‘Gianta,’ P. malacoides). Primula malacoides or fairy primrose bears red, pink, or white, 1-inch diameter flowers that are arranged on slender stalks. Other varieties of primrose have larger flowers with similar characteristics.

❖ Reiger begonia (Begonia x elatior). Reiger begonias have red flowers with four petals. Leaves are oval and may have 2-inch diameters. Flowers grow inside the foliage.
FOLIAGE PLANTS

- Boston Fern (*Nephrolepis exaltata*). Leaves of this fern have an upright growing habit. They are light green and form a thick rosette.

- Corn Plant (*Dracaena fragrans* Massangeana). The corn plant has a long woody stem or trunk. Leaves are narrow and variegated. The pattern of variegation has light green in the center and dark green on the sides of the leaves. Sections of light green variegation are separated by thin bands of dark green.

- Devil’s Ivy–Pothos (*Epipremnum aureum*). A vigorous evergreen, herbaceous vine with simple, alternate leaves which are ovate to cordate. Juvenile leaves are entire, but mature leaves are pinnatifid or perforated to 30 inches long. The petioles are channeled at the base and clasp the stem. They are glossy, bright green or irregularly variegated with lighter green shades or white. The juvenile form is the most commonly seen.

- Dumbcane (*Dieffenbachia spp.* and cultivars). This is a herbaceous evergreen perennial with thick, hinged stems. The large leaves are alternate, usually with white markings or patterns which have a very striking appearance. The petioles are long and enclose the stem. The flowers are in spadices with thick spathes.

- English Ivy (*Hedera helix*). This evergreen is a woody vine with glossy, alternate leaves of three to five lobes. Foliage is a dark, lustrous green. Stems have aerial rootlets. English Ivy is used as a climbing vine or as a ground cover.
FOLIAGE PLANTS

- Jade Plant (*Crasula argentea*). Jade plant is a small shrub with thick, succulent trunk and branches resembling a small tree. Its leaves are opposite, obovate, lack petioles, and are attached directly to the stem. They are very thick, succulent, and often have red edges.

- Madagascar Dragon Tree (*Dracaena marginata*). This plant is an evergreen, multiple-stemmed shrub with fine textured appearance. It has sword or strap-shaped leaves which are crowded into tufts at the ends of branches. These leathery leaves have a brownish purple stripe along the edges of the entire margins.

- Parlor Palm (*Chamaedorea elegans*). This is a small, fine-textured, single-trunked palm, usually standing 4 feet high. Leaves are pinnately compound; leaflets are lanceolate, with short, unarmored petioles. Fruits are black and globose, maturing throughout the year.

- Peperomia (*Peperomia spp.*). An herbaceous perennial with a clumping growth habit. The succulent leaves are quite variable in size, shape, and color. Leaves are frequently shiny and ovate. Flower spikes are small and inconspicuous.

- Philodendron—Cut-leaf (*Monstera deliciosa*). The cut-leaf philodendron is an upright plant. Leaves are glossy-green, arranged alternately, and have large lobes. The petioles are round and do not clasp the stem.

- Philodendron—Heart-leaf (*Philodendron scandens oxcardium*). An evergreen herbaceous vine, this plant has simple, entire leaves climbing by aerial roots. Leaves are glossy-green, cordate, and alternately arranged. The petioles are round and do not clasp the stem.
Rubber Plant (*Ficus elastica*). The rubber plant has large, long, alternate, leathery leaves with entire margins. Leaves are green or variegated green and yellow. It is tree-like in form and size.

Schefflera (*Brassaia actinophylla; B. arboricola*). This upright evergreen tree often has multiple trunks. It is a low-branching tree with palmately compound, spirally arranged leaves of seven to fifteen oblong leaflets radiating from the apex of an elongated petiole. Leaves on the juvenile plant are entire or sparsely dentate and are glossy green.

Silver Queen (*Aglaoenema commutatum* Silver Queen). An herbaceous perennial with attractive foliage variously marked, depending on the species. Thick stems are sheathed by leaf petioles which are shorter than the blades. The flowers are small spadices with small spathes which form showy, bright red, or yellow fruits in clusters.

Snake Plant (*Sansevieria trifasciata*). This stiff, erect, herbaceous perennial has short and thick rhizomes. Leaves are elongate, very thick, erect, flat, or cylindrical, and are usually borne basally. They are often mottled or variegated. Flowers, though rarely produced and then only on older plants, are arranged in racemes and are often fragrant.

Spider Plant (*Chlorophytum comosum* cultivars). This herbaceous perennial has linear leaves which are bright, smooth, and often lined with white bands. Leaves are arranged in rosettes, and bunches of small plantlets are produced at the end of long stolons. The flowers are small, white, up to 3/4 inches across, borne in racemes, and precede the plantlets.
Weeping Fig (*Ficus benjamina*). This evergreen tree has drooping, spreading, heavily foliated branches. The leaves, which exude a milky sap, are simple and entire with acuminate tips. They are alternate, and ovate-elliptic in shape and leathery-textured with a glossy-green color. The stem is grey, and brown aerial roots eventually appear.
**LANDSCAPE PLANTS — TREES AND SHRUBS**

- **Almond—Flowering** (*Prunus triloba*). Leaves are 1 to 2 1/2 inches long, have three lobes, are pubescent and green. Flowers are pink and about 1 to 1 1/2 inches long.

- **Arborvitae—American** (*Thuja occidentalis*). Arborvitae is a hardy, cone-bearing, evergreen tree that has flattened twigs covered with scale-like leaves. Its cones are about 1/2 inch long and have from 8 to 12 leathery scales enclosing the seed. The American arborvitae, found in the eastern United States, grows some 60 feet high. Leaves of arborvitae are yellow-green, flattened, and tiny. The aroma of the crushed leaves is distinctive.

- **Arborvitae—Oriental** (*Platycladus orientalis*). Needles are 1/2 inch long. Cones are 2/5 to 4/5 of an inch long and have 6 to 8 scales.

- **Ash—European Mountain** (*Sorbus aucuparia*). Mountain ash, in spite of its name, is not an ash at all but is in the same family as hawthorns and apples. Several species have small white flowers in flattened clusters. The compound, ash-like leaves grow alternately on the stem and have about 13 to 15 leaflets, evenly toothed. The bark is smooth, gray-brown, similar to cherry. The orange-to-red fruits are clusters of berry-like pomes and are very showy.

- **Ash—White** (*Fraxinus americana*). Leaves contain 5 to 9 leaflets. Buds have 2 to 3 scale scars and may be rusty, brown, or black. Stems are round, smooth, and may be gray, green, or brown.
Azalea Hybrid (*Rhododendron*, Mollis hybrid). Foliage of rhododendrons is deciduous. Stems are pubescent. Plants grow to 5 feet tall.

Barberry (*Berberis*). The barberry is a low-growing spiny shrub that has red leaves and bright red fruit in autumn. The two species best known in the U.S. are the common barberry and the Japanese barberry. The common barberry grows wild in the eastern United States. The spines always grow in groups of three and its berries appear in clusters. The Japanese barberry, popular in landscaping, grows more compactly. It bears its berries either singly or in pairs, and has spines that grow singly rather than in clusters. The leaves of the common barberry are saw-toothed, whereas the leaves of the Japanese barberry are smooth-edged.

Bayberry (*Myrica pensylvanica*). Leaves are 1 3/5 to 4 inches long and 3/5 to 1 3/5 inches wide, pubescent, and dark green. Each bud may have 2 to 4 exposed scales. Stems are round. Fruit is a small, grayish drupe.

Birch–River (*Betula nigra*). Leaves of the river birch are deeply serrated and grow to 1 to 3 inches long. Buds are less than 1/5 inch long, light brown, and may be pubescent. Stems are reddish. New stem growth is pubescent. Birch bark is thin and light enough to write on. Birches produce long catkins (scaly spikes) which contain tiny flowers. Birch trees sometimes grow in pairs or clusters. Their leaves grow alternately on the twig. Birch nutlets are small and grow in a cone.

Boxwood (*Buxus sempervirens*). Boxwood is a slow-growing evergreen shrub or tree much used for hedges and as specimens on lawns. In the U.S. it is found along the Atlantic Coast. The boxwood tree may grow as high as 25 feet, and has small glossy leaves and clusters of small flowers. Not only is it evergreen, but it retains its deep green color and freshness throughout the year.
**Bradford Pear** (*Prunus calleryana* Bradford). Leaves are 1 1/2 to 3 inches long. Buds are 1/2 inch long and grayish brown. Stems are smooth and brown when mature.

**Crabapple–Flowering** (*Malus floribunda*). The flowering crabapple is a most beautiful sight when thousands of pink buds open into pure white flowers, which resemble small apple blossoms and which remain in bloom for several weeks. In September the tree is covered with small, pale yellow apples about a third of an inch in diameter. The flowering crabapple will reach a height of 30 feet.

**Dogwood–Flowering** (*Cornus florida*). The cultivated forms are pink-flowered. The flower is a group of four enlarged bracts (petals) around a cluster of small true flowers. The red fruits are as attractive as the flowers, and serve as food for wildlife as well.

**European Beech** (*Fagus sylvatica*). Leaves grow to 4 inches long and are glossy when mature. Their upper surfaces are dark green while their bottom surfaces are lighter. Stems are olive to brown in color. Nuts have three sides and are spiny. Trees grow to 90 feet tall.

**Fir–White** (*Abies concolor*). Needles are 2 to 3 inches long, 1/12 to 1/10 inch wide, flat, glossy, and have two faint, white bands on their undersides. Buds are light brown and covered with resin. First-year stem growth is glossy and yellowish-green.
- **Ginkgo–Maidenhair Tree** (*Ginkgo biloba*). Leaves occur in groups of 3 to 5, are fan shaped, and range from 2 to 3 inches across. Brown buds emerge on spur growth. Young, brown, stem growth peels as it matures, exposing gray bark. Spurs are black.

- **Glossy Abelia** (*Abelia x grandiflora*). This tree grows from 6 to 8 feet tall when mature. Foliage is purplish-green and glossy. Flowers are bell-shaped, pinkish, and fruitless.

- **Gum–Sour, Black** (*Nyssa sylvatica*). Leaves are 2 to 5 inches long, may be serrated, and dark green. Buds are 1/8 to 1/4 inch long and may be yellow, brown, or red. Stems are gray, red, or brown, and have small spurs.

- **Gum–Sweet** (*Liquidambar styraciflua*). Sweet gum is often planted as a shade tree because of brilliant fall coloring in its foliage. Normally it reaches a height of 80 to 100 feet when mature. Its short, gray, horizontal branches bear thick twigs with corky ridges. The star-shaped leaves are somewhat like those of maple but grow alternately on the twigs. The leaves are deeply lobed and turn a deep crimson and brilliant scarlet in autumn. The fruit is a brownish spiny ball that remains on the tree through the winter. When it opens it releases small winged seeds which are eaten by birds.

- **Hawthorn–Washington** (*Crataegus Phaenopyrum*). Leaves may grow to 3 inches long. They are dark green on their upper surface and lighter on their undersurface. Stems are brown and have thorns 1 to 3 inches long.
Hemlock (*Tsuga*). The needles on the hemlock are short, dark green, 1/2 inch long, and flat on minute stalks in two flattened rows. These needles are darker above and silver lined below. Cones are about 3/4 inch long and grow on short stalks.

Holly—English (*Ilex aquifolium*). English holly grows to 80 feet tall. Its foliage is dark green and the fruits are bright red.

Holly—Japanese (*Ilex crenata*). Leaves are 3/5 to 1 1/5 inches long, and dark green on their upper surface.

Honey Locust (*Gleditsia triacanthos*). The honey locust is a medium-sized tree with spreading branches and handsome, finely-divided leaves. The bark of the honey locust is furrowed. In some kinds, stout spines grow on the trunk and branches. The fruit of the honey locust looks like long, somewhat flattened, and twisted pea pods.

Juniper (*Juniperus spp.*). Juniper is the common name of a group of evergreen shrubs and small trees of the cypress family. The common juniper usually grows as a low, mat-forming shrub. Junipers have distinctive, fragrant, berry-like cones, or fruits, that vary in color from blue to red. Usually the male and female flowers grow on different trees. Only those trees that have female flowers will bear fruit. The leaves of the juniper may be needle-like and prickly, or they may be scale-like and lie tightly against the twigs. Examples: Juniper-Creeping (*Juniperus horizontalis*) and Juniper-Spreading Chinese (*Juniperus chinensis*).
- **Kwanzan–Japanese** (*Prunus serrulata* Kwanzan). This genus includes possibly the greatest number of cultivars. “Kwanzan” is one of the very common cultivars with a heavy flowering display of double pinkish blossoms coming with the foliage. It has a horizontal branching pattern and rather cuppery leaves. It is a favorite for flower gardens, lawns and borders, growing to a height of about 20 feet. Leaves are 2 to 5 inches long and red or brown. Petioles are 3/5 to 1 inch long. Flowers are deep pink, 1/2 inch in diameter, and have approximately 30 petals.

- **Lilac** (*Syringa vulgaris*). The common lilac grows to a height of 20 feet and has wide, spreading branches thick with flowers. Its green leaves are about 5 inches long. The white or purple flowers grow in clusters that may be 10 inches wide.

- **Lily-of-the-Valley Bush** (*Pieris japonica*). Leaves are 1 1/5 to 3 inches long. Young leaves are bronze and later turn dark green. Flowers are white, cup shaped, and 1/5 inch long.

- **London Planetree** (*Platanus x acerifolia*). The bark of the London Planeteer is creamy white. Leaves are 5 to 10 inches wide and have 3 to 5 lobes.

- **Magnolia–Saucer** (*Magnolia x soulangiana*). The magnolia will reach a height of 70 feet. The great, waxy-white, cup-shaped blossoms contribute to its rarest beauty. Leaves may reach 6 inches long. Buds are pubescent, and reach 1/2 to 3/4 inch long. Stems are brown with grayish lenticels.

- **Maple–Japanese** (*Acer palmatum*). Leaves of the Japanese maple reach 2 to 5 inches long and may have 5, 7, or 9 lobes. Leaf color depends on cultivar. Buds are small, green or red, and are hidden at the base by the petiole. Stems are slender and range in color from red to green.
Maple–Norway (*Acer platanoides*). Norway maple is the tree sometimes mistaken for sugar maple. While the leaf is somewhat similar to that of sugar maple, it is broader—usually wider than it is long. Norway maple is a medium-sized, fast-growing tree, developing a rounded crown and dense foliage. The greenish-yellow flowers, in drooping clusters, and winged seeds which develop from them, are large for maples.

Maple–Red (*Acer rubrum*). Leaves of the red maple are 2 to 4 inches long, have 3 or 5 lobes, have green upper surfaces, and are grayish underneath. Buds may be red or green and have numerous scales. Stems are green during summer months and turn red during the winter.

Maple–Sugar (*Acer saccharum*). The sugar maple’s leaves grow opposite each other, in pairs. They are broad and flat, with veins and lobes like fingers. The fruits of the sugar maple are called fruit keys. Each has a thin flat wing. Usually two seeds grow together with the wings on each side of the seeds. Often a pair of seeds looks like the propeller of an airplane.

Mountain Laurel (*Kalmia latifolia*). Mountain laurel leaves are 2 to 4 inches long with petioles from 2/5 to 4/5 inch long. They have dark green upper surfaces and yellowish under surfaces. Flowers may be white or pink in color and have purple markings. They are 4 to 6 inches in diameter. Fruit is a brown capsule.

Oak–Pin (*Quercus palustris*). Leaves are 3 to 5 inches long, have 5 to 7 lobes, and have dark green upper surfaces and light green under surfaces. Buds are 1/8 inch long and brown. Stems are red in their first year of growth and turn green.
**Oak–Red** (*Quercus rubra*). The red oak is one of the largest oaks, reaching heights of 70 to 80 feet with a spread of 40 to 50 feet. It is an erect, high-branching tree with a few large spreading branches and slender branchlets. Its grayish-brown bark has conspicuous long, smooth plates between the furrows. The inner layers of the bark are red. The leaves tend to hang vertically on the stalks, and the lobes tend to be more triangular than in other species. The leaves are smooth or only lightly hairy along the veins with irregular teeth and bristly points that tend to point forward more than outward. The middle lobes are largest. The acorns are large and rounded in a very shallow cup.

**Oregon Grape** (*Mahonia aquifolium*). Leaves are composed of 5 to 9 leaflets. Each leaflet is from 1 2/5 to 3 inches long. Buds have several exposed scales. Stems are round and have leaf scars which partially circle the stem.

**Pine–Eastern White** (*Pinus strobus*). Slender, bluish-green needles occur in groups of five. Needles are 3 to 5 inches long. Buds are 1/4 inch long and have sharp points. Stems are pubescent and may be green or brown.

**Pine–Mugo (Swiss Mountain)** (*Pinus mugo*). Needles occur in pairs. They are dark green, 1 to 2 inches long, and have sharp points at the tips. Buds are 1/4 to 1/2 inch long, and red or brown. Young stems are green and turn brown or black as they mature.

**Pine–Scotch** (*Pinus sylvestris*). Needles are light green, twisted, and occur in pairs. Buds are 1/4 to 1/2 inch long and are brown. Stems are green when young and turn grayish as they mature.
Privet–Amur (*Ligustrum amurense*). Leaves are elliptical and grow to 2 inches long. Buds have 2 or 3 pairs of exposed scales and are brown. Younger stem growth is purplish and pubescent. Older growth is gray and less pubescent.

Privet–Japanese (*Ligustrum japonicum*). An upright, low branching, evergreen shrub or small tree. Simple, entire leaves are opposite and ovate to elliptic in shape, and dark green, leathery, and glossy. Branches have raised lenticels. Fragrant flowers are borne on terminal panicles and are white, with four united petals. The fruit is a blue-black, drupe-like berry.

Redbud (*Cercis canadensis*). Leaves of the redbud are 3 to 5 inches in diameter, have prominent venation, and their undersides may be pubescent. Buds are purplish or red, appear in clusters, and are pubescent. Stems range in color from red to brown and have reddish streaks.

Small–leaved European Linden (*Tilia cordata*). Leaves are 1 1/4 to 2 1/4 inches long and dark green. Buds and stems are brown.

Spirea (*Spirea x lamellosa*). Leaves are alternate and grow from 1 to 4 inches long. Branches are numerous and fine textured. Flowers grow in clusters and may be pink or white.

Spruce–Colorado (Blue) (*Picea pungens*). Needles are 3/4 to 1 1/4 inches long. They may be dull green, bluish, or silvery-white. Buds are yellowish brown and have loose scales. Older wood is orange-brown.
Spruce–Norway (*Picea abies*). The Norway spruce will grow to a height of 150 feet under ideal conditions. Its spread is between 25 and 35 feet when mature. It is a pyramidal tree with horizontal branches and drooping branchlets. The needles are shiny and dark green in color. Each needle is four-sided, nearly square in cross-section. The cones always hang down, mature in one season, are slender, and reach lengths of 5 to 7 inches.

Viburnum (*Viburnum*). Viburnum is a large genus of deciduous or evergreen shrubs or small trees belonging to the Honeysuckle family. In habit they are mostly compact and bushy with attractive foliage, which in many cases takes on good fall coloring. Most viburnum have showy flowers, followed by decorative fruits. Viburnum flowers are pink when in bud and white when flowering. Leaves are dark green on their upper surfaces and lighter underneath. Stems are light tan.

Winged Euonymus (*Euonymus alatus*). Mature leaves range from 1 to 2 inches long and have finely serrated edges. Buds may be green, red, or brown. Stems may be green or brown and divided into two or four wings.

Yew–Hicks (*Taxus x media* Hicksii). Yew is the name of a group of evergreen trees and shrubs. The leaves of yews are flat, pointed needles, dark green on top and pale green beneath; they spread apart in two rows along the stem. The bark is reddish brown and scaly. Yews bear scarlet berries. The trunk of the yew may grow large, and yew trees sometimes live and flourish for hundreds of years. Young branches are olive in color the first year and turn brown as they mature.

Yew–Upright Japanese (*Taxus cuspidata* Capitata). Leaves are arranged in a two-tiered, V-shape on the stem. They are 1/2 to 1 inch long. Their upper surfaces are green and their under surfaces are yellowish. Buds are brown.
Big Leaf Wintercreeper (*Euonymus fortunei* var. *vegetus*). Perhaps the most ornamental of all landscaping plants. This plant has rounded leaves 1 to 1 1/2 inches in diameter which are thick and leathery. It is a semi-shrub sometimes called the Evergreen Bittersweet. It grows as a shrub about 4 feet high and is an excellent variety, quick rooting and easy to propagate. It is an evergreen and in the fall of the year it produces wealth of colorful orange fruits. It can be used as a shrub or a vine.

Ivy–Boston (*Parthenocissus tricuspidata*). Boston ivy is the climbing vine that covers the shady sides of buildings like a lovely green carpet. It is frequently found in New England and other parts of the eastern United States. The covering is made of many overlapping leaves, each with three points and a long petiole. The leaves are up to 1 1/2 inches long and purplish when young.

Ivy–English (*Hedera helix*). English ivy is also known as Common Ivy. The leaves of English ivy are waxy and have five points, or angles. They are dark green in summer, and turn bright scarlet in the fall. The English ivy also bears small, inconspicuous flowers. The ivy can cling to smooth surfaces with the fine air roots on its stems. English ivy does not grow well in the bright sun of North America. In shady locations, however, it can be grown as far north as Ontario. It makes an excellent covering for buildings.

Japanese Spurge (*Pachysandra terminalis*). This very popular ground cover is suitable for many landscape situations. It attains a height of 6 to 12 inches and grows in both sun and shade, but winter burns in open exposed situations. It prefers a moist, highly organic, well-drained soil for best establishment. It is propagated by cuttings.
IDENTIFICATION

LIST

FRUITS AND NUTS

- Almond (*Prunus amygdalus*). Immature almonds look very much like a green peach. The shell is flattened, oval, pale to tan in color, woody, and covered with small pits or holes. The edible seed inside is oval, flattened, pointed at one end, tan in color with prominent brown lines. Leaves are similar to peach leaves.

- Apple (*Malus pumila*). The many varieties of fruit from apple trees range in size from large to medium or small. The skins of the fruit can also be thick or thin, tough or tender, and smooth or rough, depending upon individual varieties. The skins of well-colored fruit range from a deep purple or bright red to yellow or green. The flesh ranges in color from white or somewhat yellowish to being sometimes tinged with red or yellow. Some varieties are favored for their firm and crisp texture, others for being tender, juicy, sweet, and very aromatic. Specific varieties of apples are usually better suited for dessert, cooking, and baking.

- Apricot (*Prunus armeniaca*). The apricot is a golden peach-like fruit with a pit. It is smaller than a peach and has a smoother skin. Both fresh and dried apricots are eaten raw or can be cooked to make jams, pies, and puddings. It is not hardy and grows only in mild climates. It blossoms early in the spring; thus, it cannot be successfully grown in places where spring frosts are common. Apricot blossoms form delicate pink masses.

- Avocado (*Persea americana*). The avocado is a tree with fruit that belongs to the laurel family. It is sometimes called an alligator pear. The avocado may be round, egg-shaped, or in the shape of a pear. It varies in color from green to purplish black. The fruit weights 1/2 to 3 pounds. It contains a large, round seed, and is covered by a leathery skin. The yellow-green pulp, which is the part eaten, is as soft as butter and has a nutty flavor. It is rich in fruit oil and contains several vitamins.
Banana (*Musa paradisiaca sapientum*). The banana is a plant of warm areas and grows from 10 to 25 feet tall. The leaves of the banana plant look like a great drooping feather, from 1 to 2 feet wide and from 6 to 10 feet long. The fruit is slightly curved, yellow, has firm creamy flesh, grows about 5 inches long, and forms clusters 2 or 3 feet long.

Blackberry (*Rubus spp.*). The core of a blackberry will remain in the fruit when picked. The berries are large and always dark when ripe. Blackberries are either trailing vines or erect shrubs. Stems and leaves have thorns on them. Leaves are palmately compound with three to seven leaflets which are toothed.

Blueberry (*Vaccinium corymbosum*). Blueberry bushes are several feet high and are thick with many green leaves. In the blooming season they have white or pink blossoms. Blueberries are often mistaken for huckleberries. They are related more closely to cranberries. Blueberry fruits have four or five cells and small seeds. The blueberry fruit is bluish-purple in color.

Brazil Nut (*Bertholletia excelsa*). Brazil nut is a large tropical tree. The nuts develop inside a large, woody husk somewhat larger than a baseball. The husk or pod must be broken at maturity to reveal the numerous black or dark brown nuts. The shell is rough textured, and bluntly triangular like an orange segment. The kernel inside is creamy white.

Butternut (*Juglans cinerea*). Butternuts are closely related to walnuts and black walnuts, developing inside a smooth green husk. The shell is thick, rough, hard, and irregularly ridged. It is larger than a pecan and shaped much like it except for having a long pointed end. Leaves are compound.
**Fruits and Nuts**

*Cashew (Anacardium occidentale).* Cashew is a small, tropical tree. The fruit is pear-shaped, red or yellow, with a smooth, thin-shelled, grayish-green, kidney-shaped appendage suspended from the bottom end. The kernel inside the shell is light tan or whitish and curved.

*Cherry (Prunus avium sweet, P. cerasus sour).* Cherries are small, round, yellow, red, or nearly black in color and borne on long stems. The pit is small, round and smooth, somewhat like a small plum seed. Leaves are oval and pointed, with doubly serrate margins and small glands on the petiole. The skin is smooth, shiny, and thin.

*Chestnut (Castanea dentata).* The chestnut is a valuable tree which belongs to the beech family. The common chestnut is tall and spreading. It grows in the Appalachian Mountains. Its leaves are dark green and glossy, narrow, and have large hair-tipped teeth. The flowers are in long yellow catkins. The fruits are prickly burrs with a velvet lining. The burrs contain two or three smooth, brown nuts. The nuts are good to eat, have a fine flavor, and are usually roasted.

*Coconut (Cocos nucifera).* Coconut is a subtropical tree and is the largest of all the nuts, being about the size of a softball. The smooth, fibrous husk is about the size of a football and may be green, brown, or yellow at maturity. The nut inside is hard, rough, brown, has husk fibers attached to it, and has three “eyes” at one end. White coconut meat lines the inside of the shell and a quantity of coconut milk usually is inside the cavity. Leaves are very large, compound, with numerous long, narrow, point leaflets.

*Cranberry (Vaccinium macrocarpon).* The cranberry is an edible red berry that grows on a trailing vine. It has small, oval, evergreen leaves and tiny, pink flowers. The cranberries may be round or oblong, depending on the variety. They grow on small, slender stems. The plant is called cranberry, or cranberrry, since the slender stems of the fruit curve like the neck of a crane.
- **Currant—Red** (*Ribes ru-brum*) and **Black** (*Ribes nig-ru-m*). The currant is a small berry of a plant that is a low, bushy shrub. It is closely related to the gooseberry and belongs to the saxifrage family. Currants are round and smooth, and have a tart flavor. Currant berries grow in clusters like grapes but are not nearly as large as grapes. They are more nearly the size of garden peas. Red currants are used for jelly and pies; black currants are stewed.

- **Date** (*Phoenix dactylifera*). On trees, dates have a rich red or golden color. When dried, they are sweet, fleshy, oblong fruits, a deep russet or brown, and over an inch long. The long tough seed has a furrow along one side.

- **Elderberry** (*Sambucus canadensis, S. simpsonii*). Elderberries are small, black, juicy, think-skinned berries borne in large clusters of hundreds of fruit. Seeds are small and hard. Leaves are compound, usually with five or seven lanceolate leaflets having serrate margins. The woody stem is hollow and filled with soft, white pith.

- **Fig** (*Ficus carica*). Fig is the name of a popular fruit and the plant on which it grows. The fig plant may grow as a low, spreading bush or as a tree, depending on how it is pruned. The fig is sometimes called a fruit without a flower. However, the inside of each fruit has several hundred tiny flowers. An opening at the top of the fruit permits a small wasp to enter and pollinate the flowers. The fruit is 1 inch in diameter and is shaped similar to a pear.

- **Filbert** (*Corylus*). Filbert is the name for both the nut and the plant of a group of trees and shrubs closely related to the birches. The nuts of the plants are also called hazelnuts and cobnuts. Some filberts grow into large trees 60 feet tall. Others are shrubs that normally grow from 20 to 30 feet high, depending, upon what kind they are and their environment. The nuts form in compact clusters, with each nut encased within its own husk. The nuts have smooth, hard but thin and brittle shells. The filbert is shaped somewhat like an acorn. When the nut is cracked, the tasty meat can easily be removed.
Gooseberry (*Ribes hirtellum*). The gooseberry is an oval, tart fruit or berry closely related to the currant. The gooseberry may be white, yellow, green, or red, and may have a prickly, hairy, or smooth surface. The Poorman variety is large and pale green in color.

Grape (*Vitis* spp.). The grape is a smooth-skinned, juicy fruit of a woody vine; it grows in bunches or clusters on the vine. It is one of the oldest cultivated plants. The grapes grow in temperate regions throughout the world and is used in many ways.

Grapefruit (*Citrus paradisi*). The grapefruit name comes from the fact that it grows in clusters like grapes. It grows larger than the largest orange, and its smooth skin becomes bright yellow when it is ripe. The juicy flesh has an acid and mildly bitter flavor. The leaves have a leathery texture, and the flowers are large, fragrant, and white.

Hickory Nut (*Carya* spp.). Hickory nuts develop inside a smooth, green husk that turns black and splits open at maturity. The nuts are globose, hard, tan in color, slightly ridged, usually have a pronounced point at one end, and are similar to walnuts in size. The kernels are thick and wrinkled like that of the preceding nuts. Leaves are similar to pecan and are compound with many leaflets having serrate margins.

Kumquat (*Fortunella* spp.). There are several species of kumquat, each of a different size, shape, and flavor. They are the smallest citrus fruits. They are oblong or round in shape and orange or reddish-orange in color. The rind is thin and pebbly. The flesh is in three to five segments, lacking in juice, with rather large seeds for the size of the fruit. Fruit may be tart or sweet, depending on species. Leaves are small, rather narrow, pointed, and without petiole wings.
**Fruits and Nuts**

- **Lemon** (*Citrus limonia*). The lemon is a small, yellow, oval-shaped, citrus fruit. The tree is a small evergreen with spreading branches that give it an irregular shape. It is covered with short, stout spines. It has long, pointed, pale green leaves, and large, fragrant flowers that grow singly or in clusters. The buds are tinted reddish-purple, but the inside surfaces of the petals are white. The fruit is covered with a yellow skin dotted with tiny glands that look like pores. These glands contain oil. A thick, spongy membrane lines the skin. It encloses six to eight segments that contain the pulp, juice, and seeds. The juice is quite tart and is rich in Vitamin A, B, and C, and in mineral salts.

- **Lime** (*Citrus aurantifolia*). The lime is a rounded fruit pointed at both ends. It is greener than the lemon, which is of the same genus. The lime tree rarely grows higher than 10 to 12 feet.

- **Macadamia** (*Macadamia integrifolia, M. tetraphylla*). Macadamia is a large, subtropical tree. The nuts develop inside a thick, green husk which splits open at maturity to reveal the single nut. The nut is thick-shelled, smooth, light brown, round, and very hard, with a single, large, white seed inside. Leaves are long, narrow, entire or serrate.

- **Nectarine** (*Prunus persica*). Nectarines are small fruits resembling peaches. The only important difference is that nectarines have smooth skins and peaches are fuzzy. They come from identical trees. Nectarines often originate from peach seeds, and peaches may come from nectarine seeds. Botanists do not know which originated first.

- **Olive** (*Olea europaea*). The olive itself is a drupe, the type of fruit which has a pit. It is apple-shaped to plum-shaped, and the ripe fruit is purple to black. The most important material in it is the olive oil. Both seed and flesh contain much oil, which makes up 15 to 30 percent of the weight of the fresh fruit.
Orange (Citrus sinensis). The orange tree has dark green leaves which do not fall off with the seasons. The orange tree grows to a height of about 30 feet. Its branches are very symmetrical and do not spread very much. The fruit is really a special type of berry which grows only on citrus trees. The fruit has a soft central axis made of pith. Ten to fifteen segments surround the pith and contain the juice. The whole orange is enclosed in a soft rind. The inner part of the rind is white and spongy. The outer part of the rind is orange colored.

Peach (Prunus persica). The peach is an oval, yellow, edible fruit. It has a hard deeply pitted stone or core. Its flesh may be soft or quite firm. The peach tree grows 15 to 25 feet high. Its long, slender leaves have toothed edges. Flowers appear before the leaves do. The delicate pink blossoms may be large and showy, but sometimes are quite small.

Peanut (Arachis hypogea). Leaves of peanut plants are shaped like clover leaves. Female blossoms appear yellow, then turn downward and grow into the soil. When underground, they develop into peanuts. The fruit contains two to five seeds (peanuts) within their papery shells.

Pear (Pyrus communis). The pear is a fleshy, cone-shaped fruit that is large and round at the blossom end and tapers inward toward the stem. The fruit is covered with a smooth, thin skin, which may be yellow, russet, or red. Its juicy flesh is sweet, mellow, and tender, although tiny hard grit cells make the flesh taste sandy. The common pear tree may grow 45 feet high, 25 feet in diameter, and more than 75 years old. Its leaves are almost oval but have a sharply pointed tip, usually have toothed edges, and rather prominent veins. The white flowers grow in clusters of four to twelve blossoms.

Pecan (Carya illinoensis). Pecan trees produce 400 to 500 pounds of nuts each year, and may grow 180 feet high. Pecan leaves are 12 to 20 inches long and have from nine to seventeen lance-shaped leaflets. The thin-shelled pecans, called paper shell, are most popular because their shells can be cracked between the fingers.
**FRUITS AND NUTS**

- **Pineapple (Ananas comosus).** The pineapple received its name from looking like a pine cone. It is usually about the size of a coconut with a yellowish or reddish skin. Under the skin is a firm, pale yellow or white meat. A hard covering protects the fruit. The pineapple plant bears a single thick stalk with stout, toothed leaves. The ripe head results from a thickened spike of the plant. Exterioirly, the solid fruit is covered with the tips of the thick, hard floral bracts, or leaf-like petals. At the top it has a tuft of smaller leaves.

- **Pistachio (Pistachia vera).** Pistachio is a small nut that is ovoid, thin-shelled, smooth, and is tan in color. The nut develops without a husk, and the shell splits open after drying at maturity to reveal the green or yellow edible seed inside. The nut is commonly dyed red. The leaf is compound, with numerous small leaflets.

- **Plum (Prunus spp.).** The plum is a fruit that contains a cone-like seed. The plum may be as small as a cherry or as large as a small peach. It may be round or oval. The thin skin may be green, yellow, red, blue, or purple. The flesh is thick and juicy. A large flattened, hard pit in the center contains the seed. The plum crop has many uses and is dried to make prunes. The plum tree may be low and shrubby, but sometimes grows 30 feet high. It has white flowers that usually appear before the leaves do.

- **Pomegranate (Punica granatum).** The pomegranate is produced by a bush or small tree which ranges in height from 12 to 20 feet. The fruit is the size of an orange, sometimes larger. It is somewhat flattened and obscurely six-sided with a tough leathery skin which ranges from pale yellow to purple in color. The skin is always thin but it is lined with a layer of rag or pulp which may be relatively thick or thin. Within, it is divided into several cells each containing numerous seeds. The seeds are encased in a reddish, juicy pulp.
Raspberry–Black (*Rubus occidentalis*) and Red (*Rubus strigosus*). The fruit of the black raspberry is quite similar to that of the red raspberry. The primary difference in visual identification is color. As the name implies, black raspberries are black and red raspberries are red. The fruit ranges from 1/4 inch to more than 3/4 inch in diameter. Each looks like a cluster of beads. These “beads” are small cells, called drupelets. Each drupelet contains a tiny seed. Red and black raspberries grow around a part of the plant called the standard, or the receptacle. When the berries are picked, the fruit is removed entirely from the standard. The blackberry does not separate from the standard. This is the principal difference between blackberries and raspberries. The plant is medium to tall in height, upright, vigorous, and productive. The canes are covered with prickles. The drupelets (fruit) are numerous, medium in size, and slightly glossy. The fruit is medium juicy and firm.

Strawberry (*Fragaria virginiana* and *F. chiloensis*). The strawberry plant grows close to the ground and has a short woody stem. The leaves grow on the stem in groups of three. The strawberry has short roots and small white flowers that have a pleasant odor. The greenish white fruits turn to a rich red color when ripe. The fruit of the strawberry differs from the true berry such as the blueberry. The strawberry does not have an outer skin around the seed. It is a fleshy, swollen receptacle with dry yellow seeds on the outside. When the strawberry fruit enlarges, the petals of the flower fall off and all that remains is the calyx, a leafy substance shaped like a star, and the receptacle.

Tangerine (*Citrus nobilis* and *C. deliciosa*). These fruits look like oranges, except that they are smaller and flatter, peel much more easily, and separate between sections more readily. They have a thin, fragrant rind, and the fruit is delicate.
Walnut–Black (*Juglans nigra*). Black walnuts are harvested and sold for their distinctive and rich flavor. The hard and thick nut shells are usually removed before they are sold. The nuts are contained inside thick and fleshy hulls at maturity. The hulls can be mashed and the hard shelled nut removed by hand, but mechanical devices make the job easier.

Walnut–Persian (*Juglans regia*). The Persian walnut is better known to most people as the English walnut. The husk is smooth and green, about the size of a baseball. The shell is thin, tan, nearly round, roughened with net-like markings, and has prominent ridges along the suture. The meat is thick and wrinkled like that of black walnut. Leaves are compound, consisting of five to nine leaflets having entire margins. They have large leaflets, soft wood, and a mild-flavored nut.
Artichoke (*Cynara scolymus*). The artichoke is a large, gray-green vigorous plant that looks like a thistle. It is 2 or 3 feet tall, with large and prickly leaves. The soft fleshy receptacle of the flower head and the thickened base of the scales are the edible parts.

Asparagus (*Asparagus officinalis*). Asparagus crowns are grown from seed and approximately one year later are dug and planted in the permanent bed. The edible portion of the asparagus, known as shoots, will range from 4 to 8 inches long when in the edible stage. Asparagus is a perennial, meaning it comes up year after year. In spring it sends up the shoots, also called spears, which are eaten when 6 to 12 inches long and before the buds open. If allowed to grow, shoots form a large plant with feathery leaves.

Bean–Lima (*Phaseolus lunatus*). Lima beans are of either the bush or climbing form. The seeds are white, either small or large, flat or plump, depending on the species. The pods are green, wide, and relatively flat. We eat only the seeds which are large, broad and flattened. Pods are short, flat and broad, containing two to four seeds. The plant may be low and bushy (very much like snap bean plant) or may be a climber. There are three leaflets to each leaf.

Bean–Snap (*Phaseolus vulgaris*). The name snap bean includes all varieties of bush beans and green and wax pole bean varieties, but excludes lima beans. Snap bean varieties are often referred to as “string” beans. When the pods are immature they are boiled and served as a vegetable. When mature the seeds are often “shelled” and cooked like peas or baked. We can eat the entire pod. Pods are 3 to 7 inches long, narrow, and fleshy. Seeds are smaller than lima beans, oval, and not flat. The plants are low and bushy, about 12 to 18 inches high. Each leaf has three large leaflets.
Vegetables

- Beet–Red (Beta vulgaris). Beet plants grow from enlarged fleshy structures called a root. This enlarged root consists of both root and stem tissue. Mature roots are smooth and round, oval, or oblate in form, depending upon the variety, and have 2 1/2- to 3 1/2-inch diameters. At the ground line and below, the skin is a purplish-red to maroon-red color. The root is approximately circular in cross-section and usually has ten to fourteen easily distinguished concentric zones of narrow or interrupted light-red and broad dark-red flesh. Beets have large, green to dark green leaves, often with red veins. Seeds are brown and cory, about 3/16 of an inch in diameter.

- Broccoli (Brassica italica). Broccoli does not form a solid head as does cauliflower. It is grown for its thickened flower shoots that arise from the crown and from the axils of the leaves. The edible portion is made up of several small, blue-green “heads” or clusters of flower buds. We eat the flower bud clusters and their stems while the buds are still tiny and dark green. The plant looks very much like cauliflower. Both have a central stalk topped by the flower cluster (about 6 inches across), and surrounded by the large leaves. Broccoli leaves are usually more deeply cut than cauliflower leaves. Small bud clusters are produced on side-shoots.

- Brussels sprout (Brassica oleracea gemmifera). Brussels sprout sends up a tall stalk along which the sprouts grow closely together. The earliest sprouts form near the ground. Later in the season, others appear farther up the stalk. Each sprout looks like a tiny head of cabbage. Clusters (or heads) are smaller than broccoli and cauliflower.

- Cabbage (Brassica capitata). There are three kinds: white, red, and savory. Head shapes vary from cone and globe to flat. The leaves of the plant grow close together to form a hard head. The leaves of the white and red cabbage are usually quite smooth; those of savory appear wrinkled or blistered. Plants form large, rounded heads made up of overlapping layers of leaves. The leaves may be smooth or crinkled, green or dark red. The stem is short and hidden within the mass of leaves.
**Carrot** (*Daucus carota*). The roots are between 6 and 10 inches long, and are 1 inch to 2 1/2 inches thick. The long, reddish-yellow roots of the carrot are eaten raw in salads, or boiled. They have thin, lacy leaves on long stems. Leaves are much divided and fine-textured and have a distinct aroma when crushed. Carrot seeds are tan to brown in color, rough, pointed, curved, essentially two-sided, up to 1/8-inch long.

**Cauliflower** (*Brassica oleracea*). Cauliflower is related to cabbage. It has a thick, white, round head made up of tight clusters of flower parts with short, fleshy stalks. Many short, thickened leaves grow around the flower clusters, and several large green leaves grow around the outside of the head. Sometimes growers tie the outside leaves over the head to keep the flowers white. Often though, the leaves grow over the head naturally. We eat the flower bud cluster that is usually white, but sometimes green or purple. The buds are so small that the individual ones can’t be seen. The plant resembles broccoli.

**Celery** (*Apium graveolens*). Celery is a popular vegetable related to parsley and parsnips. People eat the stiff, crisp leafstalks either raw or cooked. Plants have coarsely toothed leaves at the tip of each stalk. Full-grown celery plants may be from 20 to 30 inches high. The plants grow best in moist, fertile soil; even then, they grow quite slowly. Pascal (green) celery is most often seen in stores. Blanched (white) celery is a type that contains less chlorophyll (green color). We eat the petioles of the leaves. These green, pale green, or yellow stalks are long and straight, “C” shaped in cross-section, have ridges down the outer sides, and grow in the center. Leaves are deeply cut and fine textured.

**Cucumber** (*Cucumis sativus*). The cucumber plant is a hairy-stemmed vine that bears many tendrils. Its triangular leaves may have three-pointed lobes. It bears yellow or whitish flowers on short stems. Its edible fruit may vary in size depending on variety. The pulpy fruit contains many seeds and is covered by a thin, smooth or prickly skin. Most varieties are green, long, and have a tough green skin that is often spiny when the fruits are small. The vine will trail or climb and has large leaves. Seeds are flattened, white, and about 1/4 inch long.
- Eggplant (*Solanum melongena*). Eggplant is a vegetable that bears large purple fruits shaped like an egg. The plant grows on a bush that stands 2 to 3 feet high. It grows only in warm weather, and takes 115 to 120 days to ripen. Fruits hang among the grayish-green, hairy leaves, and sometimes grow nearly as large as a football. Eggplant fruits are 4 to 10 inches long, but usually are somewhat pear-shaped, with smooth, shiny skin that is usually purple-black, but can be white, red or yellow. The flesh is white or yellowish. The bushy plant is about 1 1/2 to 2 feet tall. Leaves are large and rather heavy, with hairs and spines on them and on the stems.

- Endive (*Cichorium endivia*). Endive is a leafy vegetable closely related to chicory. Endive is a low-growing plant. It has curled or fringed leaves. The outer leaves are green and the center leaves or heart and the midribs are pale green to creamy white. It has a slightly bitter but pleasant flavor and is often used in salads.

- Garlic (*Allium sativum*). Garlic is a plant grown for its pungently flavored bulb, which is used to season foods. It is a bulbous-rooted perennial plant. The root is a compound bulb consisting of several smaller sections or cloves which are enveloped by a common skin or membrane. A garlic bulb has a strong characteristic odor and an acrid taste. It differs from the onion only by being more powerful in its effects.

- Kale (*Brassica oleracea*). Kale is a vegetable somewhat like cabbage, but with loose curly leaves instead of a head. It ranges in color from bright green to bluish-green. The plant stands 12 to 15 inches tall and its leaves are large, finely curled and plumed.

- Kohlrabi (*Brassica oleracea*). Kohlrabi has an unusual appearance which distinguishes it from other members of the cabbage family. Instead of a head of closely packed leaves, there is a globular swelling of the stem, some 3 or 4 inches in diameter, just above the ground. The leaves are similar to those of a turnip.
**Lettuce** (*Lactuca sativa*). Leaves surround the core or stem and overlap each other to form a head. The crisp leaves can be green or red, smooth or crinkled. Seeds are black or white and about 1/8 inch long.

**Muskmelon** (*Cucumis melo*). Muskmelons grow on vines that are sometimes 7 feet long. Two or three melons grow on each vine. Muskmelons may vary greatly in the size and color of the rind and flesh. For example, the honeydew melon has a green, smooth rind and green flesh, while the cantaloupe has a yellowish-brown rind and yellow-orange flesh. Ripe muskmelons have a distinctive, sweet flavor, and give off an odor which is much like that of musk. The outer shell or rind is fairly hard. The thick inner layers of juicy pulp (flesh) are eaten. Cantaloupe are rounded or oval fruits, 8 to 10 inches long. The skin is tough and thick, and may be smooth or netted. The flesh is orange or green, juicy and fragrant with the seeds in the center. Seeds are pale and about 3/8 inch long.

**Okra** (*Hibiscus esculentus*). Okra is a plant cultivated for its immature pods and as a vegetable. The plant is an annual growing to a height of from 2 to 8 feet and bears rounded, fine-lobed leaves, and greenish-yellow flowers. The pods are from 4 to 6 inches long, but sometimes a foot when full grown. The pods are generally cooked and canned when they are young and tender.

**Onion** (*Allium cepa*). The onion is well known for its strong taste and odor. The odor is due to a mildly stimulating oil. This oil readily forms a vapor which escapes into the air when the onion is peeled or cut. It affects nerves in the nose connected with the eyes, and makes tears flow. The onion plant is a biennial, or a plant that lives for two years. The onion plant has a few shallow, narrow, green blades extending out of white sheaths. The upper part of the plant is a set of leaves growing inside each other. The lower parts of the leaves become very thick. The bulbs are enclosed in a thin papery covering made up of dried outer leaves. Bulbs have either a dry white, yellow or red colored skin surrounding the many fleshy scale leaves. The different kinds of onions have many different sizes, colors, and shapes. The flowers are small and white, and grow in rounded clusters. Onion seeds are black, smooth and are about 1/16 inch across.
- **Pea** (*Pisum sativum*). The small, round pea is one of the more nourishing of all vegetables. The round and smooth seeds, which is the part we eat, grow in long, oblong green pods that contain from three to nine seeds. The pods grow on vines that produce beautiful white flowers. Some varieties have edible pods. The dried seeds which are planted are wrinkled. Plants are vines, have tendrils for climbing, and grow rapidly. The pea is a hardy, cool-season crop and cannot stand much summer heat.

- **Pepper** (*Capsicum frutescens*). The pepper is a shrubby perennial plant native to North and South America and is grown primarily for its fruit. The plant has smooth stems and smooth, ovate leaves. In areas where there is frost, pepper plants are grown as annuals. Botanists class the fruit of the garden pepper as a berry. Many seeds are contained within the fruit walls. The immature fruits are green, but change to red when they are fully ripened. There are “hot” and “sweet” peppers. Pepper fruits are red, green, or yellow when ripe. They can be large or small, squarish, round, or thin.

- **Potato** (*Solanum tuberosum*). The edible part of the potato is a tuber that grows in the ground. Tubers are not part of the roots of the plant, but are formed from underground stems. Potatoes are usually round or oval, solid, and rather hard. Their skin is thin and usually brown, but some varieties have reddish skins. The common potato is called the white potato or Irish potato. Leaves are compound and dark green.

- **Potato–Sweet** (*Ipomea batalas*). Sweet potato is an annual vine related to the morning glory. Its buds are usually present only at the end attached to the stem. It is grown for its swollen, tuber-like roots which are a popular (principally winter) vegetable. Sweet potatoes are dry and grainy, like the Jersey Yellow or Triumph, or damp and sweet like the Porto Rico. The skin colors are pink, orange or bronze. Sap is milky; leaves are alternate. The roots are long with pointed ends. Some of the
roots become large and fleshy.

- **Radish** (*Raphanus sativus*). The radish is an annual plant grown for its edible root. The plants most often grown in the United States are called spring radishes. The roots may vary in shape, size, and color according to the variety. Probably the most widely used cultivars are species of the red radishes. Radishes have leaves similar to beets except that they are smaller and entirely green. The most common radishes are very round or only slightly oval with bright red skin. Some radishes are elongated, usually with white skin. Radish seeds are brownish, rounded and about 1/8 inch long.

- **Rhubarb** (*Rheum rhaponticum*). Rhubarb, or pieplant, is one of the few perennial vegetables. The plant forms a large, yellow, storage root and a mass of feeder roots underground. The roots produce buds from which grow long, thick leaf-stalks, with large leaves. People use the reddish,

- **Spinach** (*Spinacea oleracea*). Spinach is a low-growing annual plant that produces a thick cluster of wide, succulent leaves. The leaves of the spinach plant are fairly large, crumpled, and are a rich, glossy green. We eat the leaves. Spinach does not form heads. Seeds are about 1/8 inch long.

- **Summer Squash** (*Cucurbita pepo*). Fruits are thin skinned with solid, crisp, succulent interiors. There is much variation in fruit shape, size, and color (from green to yellow to white). Main varieties or types are crookneck, straightneck, scallop, and zucchini.

- **Sweet Corn** (*Zea mays*). We eat the seeds or kernels of sweet corn. Each kernel is a one-seeded fruit. An ear of corn is covered with leaf-like husks, under which the kernels grow on the cob. One or two ears grow on 4- to 8-foot plants. Leaves are very long. Suckers and prop roots often form at the base of the stalk.
juicy stalks for food.

- Swiss Chard (*Beta vulgaris*, cicla group). The leaves are large, smooth, spinach-like, and grow upright from a central crown. Each leaf has a long, white, fleshy petiole or stem. Color varies from medium to deep green. One variety has deep red stems and midribs.

- Tomato (*Lycopersicon esculentum*). The tomato usually is a large, round, smooth fruit that is green at first, and turns red when it ripens, but can be oval or pear-shaped and sometimes is yellow or orange. The plant that at first looks like a wide, spreading bush, tends to lie near the ground as fruit ripens. Each of several tomatoes on the plant can vary from 1 inch to 6 inches in diameter. The plants are large, thick-stalked vines. Leaves are compound and hairy with a distinctive odor.

- Turnip–Root (*Brassica rapa*). The turnip is a fast-growing, cool-season vegetable. The upper part of the root becomes greatly enlarged to form the main part we eat. The root of the turnip is purple on the upper surface and white on the lower portion. The root is round, flat, or top-shaped, depending on the variety.

- Watermelon (*Citrullus vulgaris*). The watermelon is a vine plant that produces large green fruits with a hard rind (outer shell). The fruits are 93 percent water, can be round or oval, and 8 inches to 2 feet long. The fruits are completely filled with a delicious, sweet tasting, and refreshing pulp. This pulp usually turns red as the fruit ripens. The flat seeds found in the pulp may be white, brown, or black, and about 1/2 inch long. The vines holding the fruit may branch out 12 or 15 feet in all directions. Watermelons average between 20 and 35 pounds, and they often weigh 40, 50, or even 60 pounds. Their color varies from plain dark green to mottled and striped green or almost white. Leaves are 6 to 8 inches across and are deeply lobed.

- Winter Squash (*Cucurbita moschata* or *maxima*). Fruits are very firm with tough outer skin making them suitable for storage. Most fruits have a hollow seed cavity and yellow to orange flesh. There is much variation in shape, size, skin texture, and color. Some common types are butternut, acorn, table queen, delicious, and hubbard.
**Aphid** (*Aphis spp.*). Aphids are tiny, soft-bodied insects that suck the juices of plants. They have plump bodies, small heads, and mouths shaped into sucking tubes. Their colors may be green, black, whitish, or other colors. In many kinds of aphids, some males have four wings, while many females are wingless. Most aphids produce a sweet fluid called honeydew.

**Armyworm** (*Pseudaletia unipuncta* Haworth). The moth form is uniformly pale brown with a prominent white dot near the center of the front wings, and the wingspread is about 1 1/2 inches. The eggs, white with a light greenish cast, are laid in clusters or rows on lower leaves of grass and corn plants. Newly hatched larvae are mostly pale green. Upon becoming about half grown (3/4 to 1 inch) their body color becomes basically brown with considerable color variation among individual worms. Full-grown worms are about 1 1/2 inches in length with a narrow broken white stripe down the center of their back and have stripes along each side of their body.

**Bagworm** (*Thyridopteryx ephemeraeformis* Haworth). The bagworm is most easily recognized by the case or bag that the caterpillar forms and suspends from ornamental plants on which it feeds. The bag is made of silk and bits of host leaves and twigs. These materials are interwoven to disguise and add strength to the case. When the caterpillar is mature, the bag may be 30 to 50 mm in total length. Young larvae hatching from the eggs are approximately 2 mm long, glossy black on the back and dull amber on the undersurface of their bodies. Full grown larvae are dull, dirty gray and splotched with darker markings toward the head. Mature larvae are about 18 to 25 mm long. The adult female bagworms are worm-like and lack eyes, wings, functional legs, and mouth parts. She never leaves the bag she constructed as a larva. The adult male is sooty black and moth-like with transparent wings that are nearly devoid of scales.
Beetle—Asparagus (*Crioceris asparagi* L.). The asparagus beetle is 1/4 inch long. The head is bluish, the neck is reddish and the wing covers are dark blue with yellow spots. The twelve-spotted asparagus beetle is reddish-orange with six black spots on each wing cover. The larva or grub of the asparagus beetle is dark gray with black legs and head.

Beetle—Colorado Potato (*Leptinotarsa decemlineata* Say). In the spring and again in midsummer females deposit yellowish orange eggs on the undersides of potato leaves. Eggs are deposited in clusters of 10 to 40, and hatch in 4 to 9 days, depending on temperature. The larvae resemble small, red, wet grubs. Body size, shape, and color can be used to distinguish each stage of growth. Small larvae are approximately 1/16 inch to 1/8 inch in length. They are crimson with black legs and two rows of black spots on the side. Both the head and thorax (the segment immediately behind the head) are black. The body is covered with fine, black hairs. Medium larvae grow to 5/16 inch in length, are hairless, and are lighter in color than small larvae, with a narrow red band between head and thorax. Large larvae molt and grow to 5/8 inch in length. They appear bloated and humpbacked. Body color fades to pinkish orange with a narrow black band across the back edge of the thorax. Adults are oval shaped beetles 1/2 inch in length with black and cream stripes on the back. Males are slightly smaller than females.

Beetle—Japanese (*Popillia japonica*). The adult Japanese beetle is less than 1/2 inch long, and about 1/4 inch wide. Coppery-brown wings cover its metallic-green, oval-shaped body. Along the sides of the abdomen are five white spots made of tufts of white hairs; and two distinct white spots show at the tip of the abdomen below the tips of the wing covers. The larva is a white grub resembling that of the common June beetle, but only about half as big.

Beetle—Mexican Bean (*Epilachna varivestis* Muls). Adult is yellow with sixteen black spots on its wings. Adult and larvae feed on undersides of leaves, giving them a lace-like appearance.
**Insects**

- **Beetle–Cucumber** (*Acalynna vitatum* Fab.). Also known as the striped cucumber beetle, both spotted and striped cucumber beetles are general feeders as adults. They chew holes in the foliage and eat on the stems.

- **Beetle–Corn Flea** (*Chaetocnena pulicaria* Melsh) and Spinach flea beetle (*Disonychia xanthomelas* Dalman). Each is a chewing insect, producing small round holes in leaves of plants. There are a variety of species of flea beetles. A common characteristic of all species is their elongated back legs for leaping.

- **Black Vine Weevil** (*Otiorynchus sulcatus* F.). Black vine weevils overwinter as immature, legless, C-shaped, white grubs in the soil. Adults are black, flightless, about 3/8 inch long, and have a pronounced nose or snout. All adults are females and are active night feeders.

- **Cabbage Looper** (*Trichoplusia ni* Hubner). These pale green worms have light stripes down their back. They crawl with a very distinctive looping or measuring movement. Imported cabbage worms are velvety-green.

- **Cabbage Worm – Imported** (*Pieris rapae* L.). They hibernate as pupae and emerge as the familiar White Cabbage butterflies. They are velvety green in color.

- **Corn Earworm** (*Heliothis zea* Boddie). Green, pinkish or brown worms with light stripes along their sides and on their backs. They range in size up to 1 3/4 inches. They are usually called budworms early in the season when they feed in the whorl.

- **Cutworm** (*Acteia fennica* Tauscher). There are many genera of cutworms. They are fat caterpillars of a hairless, dull-colored, medium-sized moths.
Eastern Tent Caterpillar (*Malacosoma americanum* Fabricius). The egg mass of the eastern tent caterpillar encircles small twigs and appears to be varnished. Small larvae spin fine strands of silk wherever they crawl. As the larvae grow, so does the size of their tents. Fully grown larvae are about 2 inches long, generally black with a white stripe down the middle of the back. Mature caterpillars will leave the host tree to search for a suitable place to spin their pale yellowish cocoons. During late June and July the reddish-brown adult moths with two oblique, white bands on the forewing emerge from their cocoons.

European Corn Borer (*Pyrausta nubilalis*). The borer is the larva of a night-flying moth. It is pinkish or flesh-colored, 3/4 inch long, and marked with brown spots. A faint stripe can usually be seen down the middle of the back.

Fall Webworm (*Hyphantria cunea* Drury). The fall webworm overwinters as a brown pupae in a cocoon that is concealed in trash, ground litter, cracks and crevices, or in the soil. Moths vary considerably in color from pure white to white with black spots; their wingspread is about 1 1/4 inches. Young larvae are pale yellow with two rows of black marks along their bodies. When fully grown, they are covered with whitish hairs which spring from black and orange warts. The larvae vary as to the depth of coloring and markings, but are usually greenish with a broad, dusky stripe along the back and a yellow stripe along the side.

Gypsy Moth (*Lymantria dispar* L.). The young hairy larvae feed on foliage and remain on trees night and day. After the second molt (in late May when half grown), larvae change behavior and usually feed in the trees at night, but move down to seek shelter in bark crevices or under trash during the daylight. Male moths are dark buff and fly readily during the day. Females are white with black markings; they have robust abdomens and do not fly.

Lacebug–Azalea (*Stephanitis pyrioides* Scott). Green insects with a wing span of 1 1/4 inches.
**Leafhoppers—Potato** (*Empoasca fabae* Harri). These small, active, wedge-shaped, sucking insects readily run, hop, or fly when disturbed. They are usually light green to yellowish or dark, sometimes marked with red stripes.

**Leafminer—Spinach** (*Pegomya hyoscyani* Panzer). Adult leafminers are small black flies, approximately 1/10 inch long, with yellow stripes. The larvae are yellowish.

**Mealybug—Citrus** (*Planococcus citri* Risso). Mealybugs are 1/5 inch long. They are covered with a waxy or mealy secretion.

**Mite—Clover** (*Bryobia pratiosa*). Mites are small red, black, or brown arthropods.

**Sapbeetle—Dusky** (*Carpophilus lugubris* Murr). Adult sap beetles are 1/4 inch long. They have orange-red spots on their wing covers.

**Scale—Hard** (*Lepidosaphes ulmi* L.). Also known as Oystershell scale. Crawlers are lemon-colored and very small: 1/100 inch long. When they settle, a waxy secretion produces a grayish-yellow scale covering which becomes darker with age. The male scale is oblong with a small black spot near one end and is much smaller than the female. Color varies with age; very young females are round and nearly white but turn dark gray as they mature. A characteristic black spot appears in the center of the scale.

**Scale—Soft Shell** (*Fiorinia externa*). The scale of the adult female is easily recognized by a flattened, elongated covering which is brownish-orange and about 1.5 mm in length. The scale covering the male is slightly smaller and white.
Insects

- Slugs—Grey field (*Deroceras reticulatum*). Mature slugs are mostly gray to brownish-gray, and are legless. They have two pairs of retractable front tentacles with eye spots on the tips of the larger pair. They are soft bodied, rather plump, and vary considerably in length from 1/2 inch up to several inches; most are 3/4 to 1 inch. All slugs are covered with a slimy, milky film of mucus and are extremely difficult to hold between the thumb and finger. The eggs lack color; have a watery, gelatinous appearance; are round to oval in shape; and between 1/8 to 1/4 inch in diameter. Newly hatched slugs closely resemble adult slugs, except for size.

- Squash Bug (*Anasa tristis* DeGeer). The adult squash bug is brown, 1/2 inch long, and gives off a distinct odor when handled. The orange egg is 1/7 inch in length and flattened on three sides. Young nymphs are grayish-white.

- Squash Vine Borer (*Melittia cucurbitae* Harris). Small white worms up to 1 inch long.

- Thrips (*Thrips tabaci* Lindeman). Thrips are small, less than 2 mm in length, and because of their minute size usually go unnoticed. Adults are pale yellowish to brownish, with four long, narrow wings fringed with long hairs. Immature thrips are similar in shape to the adults, but smaller in size, wingless, and lighter in color.

- Western Corn Rootworm (*Diabrotica virgifera* LeConte). The adult is the only developmental form of western corn rootworm that can be distinguished visually without the aid of a microscope. Adult western corn rootworm beetles are only about 1/4 inch long and have three dark stripes on their wing covers. On some beetles the strips overlap, making the wings appear dark brown or black. Larvae are white, measure about 1/8 to 1/2 inch long, and have brown heads, six small forelegs, and slightly wrinkled skin. Larvae also have a dark plate on the top side of the last abdominal or tail segment. The pupae are white, but otherwise similar in appearance to the adults.
White Fly–Sweet Potato (*Bemisia tabaci* Gennadius). Adult white flies are very tiny, mothlike, white winged insects. Nymphs are yellowish, legless, flat, and oval. Eggs are yellow and cone shaped.

White Grub (June Beetle) (*Phyllophaga rugosa*). White grubs are the larvae of the June beetle. They have a smooth curved body, white except for the swollen dark-colored posterior portion; six legs, a large brown head, and distinct jaws. They range from 1/2 to 1 inch long. The June beetles are large, brown to black, thick-bodied, robust beetles often referred to as “June bugs” or “May beetles.”

Wireworm or Click Beetle (*Limonius* spp.). The wireworms are the larvae of the click beetles. They are slender, smooth, usually dark brown and hard-shelled, but sometimes are soft and yellow creatures varying from 1/2 to 1 1/2 inches in length. They received their name because they look somewhat like a piece of wire. The click beetle is a hard-shelled, slender, brownish, grey, or black beetle, about 1/2 inch long. It gets its name from the fact that when it falls or is placed on its back it will throw itself several inches into the air causing a sharp “click.” If it comes down right side up it hurries away; if not it tries again and again, because it cannot roll over.
**IDENTIFICATION LIST**

**WEEDS**

- **Annual Morning Glory** (*Ipomoea species*). The annual morning glory has slender, trailing, and twining hairy stems that are several feet long, with leaves that are broad, arrow-shaped or heart-shaped. The funnel-shaped flowers range in color from red, blue, purple, or white and are usually less than an inch long. Flowers open early in the morning and sometimes close before noon.

- **Black Nightshade** (*Solanum spp.*). This summer annual has erect, branched, alternate, smooth stems that are 6 inches to 3 feet tall. Its leaves are smooth, egg-shaped, alternate, and have slightly toothed edges. Flowers, which become smooth, black berries, are found in small hanging clusters on long stalks. The plant is found in cultivated lands, fencerows, and gardens.

- **Broadleaf Plantain** (*Plantago major*). The common, or broadleaf, plantain which gardeners find so troublesome may be recognized in spring by its rosette, or broad, light-green leaves that grow from the roots. Tall, slender spikes grow upward from the center of the leaf clusters. These spikes are thickly covered with tiny green flowers all summer.

- **Buckhorn Plantain** (*Plantago lanceolate*). This plant is similar to common or broadleaf plantain, except its leaves are narrower and longer. Leaves form a rosette with tall, slender spikes growing from the center of the leaf cluster. These spikes are thickly covered with tiny green flowers all summer.
Canada Thistle (*Cirsium arvense*). Canada thistle is a perennial broadleaved weed with creeping roots that extend up to 17 feet horizontally and 20 feet vertically. Plants grow 2 to 5 feet high. Their stems are slightly hairy when young and grow hairier with age. Leaves are alternate and oblong, and have irregularly lobed margins with spiny crinkled edges terminating in a spine. The upper side of the leaf is dark green; the lower side is light green and slightly hairy. Some plants have leaves that are smooth on both sides. Canada thistle leaves are stalkless. The base of each leaf surrounds the stem, giving the impression that the stem is also spiny. Flower heads of Canada thistle are flask-shaped, measure 1/2 to 3/4 inch in diameter, and contain many small tubular flowers. Spineless bracts surround each flower head. Flower color varies from white to pale blue to purple. Most flowers are rose-purple.

Common Chickweed (*Stellaria media*). Cotyledons are ovate, have pointed tips, and are small (1-6 mm long). Stems and leaves have a few bristly hairs. Stems are much branched, creeping, or ascending. Their small, egg shaped leaves are opposite, smooth, and have a line of hairs on the petioles. The flowers are star-shaped sepals with five deeply notched white petals. Seed pods are egg-like, break into five parts, and contain many small, reddish-brown seeds. The plants are spreading and grow 4 to 12 inches tall.

Common Lambsquarters (*Chenopodium album*). Lambsquarters is a tall herb with dense clusters of tiny green flowers. The plants range in size from only a few inches to more than 6 feet. Lambsquarter is an annual with more or less striped and grooved stems. The leaves are alternate, pale green above, mealy white below, and coarsely toothed. The petiole is about as long as the leaf.

Common Ragweed (*Ambrosia artemisiifolia*). Common ragweed is a coarse annual plant with finely divided leaves. It usually grows 1 to 3 feet tall, but sometimes may grow taller. Its small, hard fruit has several short, sharp spines near the end.
Crabgrass (*Digitaria ischaemum*). Crabgrass is an annual that develops from seeds produced the previous year. The plants mature during late summer and early fall and form purplish seed heads that give the lawn an unsightly appearance. The seed heads are borne on stalks that sometimes reach a height of 16 inches. The seed heads have the appearance of a chicken’s foot. The plants are erect at first but soon become decumbent, with branching and rooting at their nodes.

Dandelion (*Taraxacum officinale*). Dandelion is a bright-yellow wild flower that grows in lawns and meadows. It has smooth leaves with coarse notches which look like teeth. The golden-yellow head is really a cluster of flowers. The dandelion has a smooth, straight, hollow stem, and the entire plant contains a white, milky juice. The root is long, thick, and pointed, with hair-like root branches growing from it.

Foxtail (*Setaria spp.*). These summer annuals have stems that are erect and one to two feet tall. Leaves are flat, some with a spiral twist, and have many long hairs on their upper surface near their bases. The panicles are dense, erect, spikelets with five or more bristles.

Galinsoga (*Galinsoga spp.*). These summer annuals have stems that are 4 to 20 inches tall, hairy, and branched. Leaves are opposite, oval, wavy margin, and hairy. Flower heads are small with white petals.

Horsenettle (*Solanum carolinense*). This plant is perennial with extensive, deep, creeping rootstocks. Stems are single or blanched and one to two feet tall. Leaves are alternate, wavy edged, or lobed, with yellow spines on leaf mid-ribs, veins, and stems. Purplish or white flowers form in clusters at stem ends. Berries are smooth, large, and yellowish-orange.
- Nutsedge (Nutgrass) (*Cyperus esculentus*). Nutgrass has one distinguishing feature, its triangular stem. The leaves are long, narrow, thin, and are arranged in three spirals at the base. Nutgrass ranges in height from 8 to 36 inches. It grows from tubers bearing weak stolons. The plant is yellowish in color. The flowers are small, yellowish or yellowish-brown, and are arranged in narrow spikelets on an umbel-like inflorescence.

- Oxalis (*Oxalis deppei*). Leaves are similar in shape and arrangement to a shamrock. Flowers are rose-pink or white.

- Pigweed (*Amaranthus retroflexus*). Pigweed is a common annual weed. Its strong, hardy, red root thrives in any cultivable soil. This persistent weed sometimes grows 3 to 4 feet high. It produces large coarse leaves and small greenish flowers that grow in a densely-crowded head. The leaves are usually covered with stiff hairs. The dull, dark green leaves of redroot pigweed are alternate, distinctly veined, and sparsely hairy.

- Prostrate Knotweed (*Polygonum aviculare*). Cotyledons are very narrow, 10 to 15 mm long, and 1 to 2 mm broad. Leaves are elliptical-lanceolate, close together, and have a distinct membranous sheath on stems.

- Prostrate Spurge (*Euphorbia supina*). Cotyledons are 1.5 to 3 mm long, tender, green, and smooth, with a powdery bloom above and magenta beneath, as is the leaf stalk. The plant is bitter tasting. Its paired leaves are connected by a nodal line with stipulates on both sides of the stem; the leaves are thick, dull pink beneath, and have a minutely granular bloom, some soft smooth hairs, and usually a dark red spot on upper surfaces. Leaf stalks are red-tinged. The stem is tinged with dull pink and has some soft hairs. Leaves and stems contain milky juice.
Purslane–Pusley, Pursley, Wild Portulaca (	extit{Portulaca oleracea}). An annual, this plant multiplies by seed. Plants are prostrate (lying flat on ground), 4 to 12 inches or more in length, and branching from all sides of the central root. Leaves are small, wedge-shaped to oblong, 1/2 to 2 inches long, very thick, and fleshy. Both stems and leaves have a reddish tinge. Flowers are 1/2 inch in diameter and open only in bright sunshine.

Quackgrass (	extit{Agropyron repens}). Quackgrass looks somewhat like wheat. The stems that bear the seeds grow 1 to 4 feet tall, and the leaf blades are 3 to 12 inches long. The tough underground stems or rhizomes spread far, often piercing the roots of other plants. The seeds are grown in spikelets.

Smartweed (	extit{Polygonum pensylvanicum}). An annual, this plant multiplies by seed and grows 10 to 14 inches tall. Stems are long and slender with few branches. Leaves are narrow and lance-shaped. The seed (achene) is lens-shaped to ovoid, and dull, reddish brown.

Velvetleaf (	extit{Abutilon theophrasti}). This is a summer annual that grows from seed each year, attaining heights of 1 to 5 feet. Mature plants generally are unbranched and have a strong taproot, the sturdy stem becomes weedy at maturity. Leaf blades are 2.4 to 7 inches long and 2 to 6 inches wide. The plant has a strong, unpleasant odor when crushed. Flowers of velvetleaf are about 1 inch across and singular, arising from the base of the leaf stalk. The flowers have five petals which are normally yellow to orange-yellow. Several other plants resemble velvetleaf in having heart shaped leaves, but they all lack the dense and velvety hairs of velvetleaf.

Venice mallow (	extit{Hibiscus trionum}). This plant has cotyledons that are round or heart-shaped and have a hairy stalk that is yellow-green in color. Leaves are dull green, irregularly shaped, and hairy. Older leaves have three to seven lobes.
Wild Buckwheat (*Polygonum convolvulus*). Cotyledons are narrow and about 20 mm long. Leaves are triangular or heart-shaped and pointed with smooth edges. Stems are red and twining or creeping.

Wild Mustard (*Brassica kaber*). This winter annual has stems that are erect and branched near their tops. Lower leaves are lobed and have petioles. Upper leaves are smaller, alternate, and have clusters at ends of their branches. Seed pods are slender, more than an inch long, and have a beak that is about one-third the length of the pod. Seeds are smooth, round, hard, and black to brown.
Prepared by Timothy J. Rollins, assistant professor of agricultural and extension education; and Nancy Conjour-Colgan, graduate student in agricultural and extension education.

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<tr>
<td>Lily-of-the-Valley Bush (<em>Pieris japonica</em>)</td>
<td>48</td>
</tr>
<tr>
<td>Oak–Pin (<em>Quercus palustris</em>)</td>
<td>49</td>
</tr>
<tr>
<td>Oregon Grape (<em>Mahonia aquifolium</em>)</td>
<td>50</td>
</tr>
<tr>
<td>Ivy–Boston (<em>Parthenocissus tricuspidata</em>)</td>
<td>53</td>
</tr>
<tr>
<td>Ivy–English (<em>Hedera helix</em>)</td>
<td>53</td>
</tr>
<tr>
<td>Japanese Spurge (<em>Pachysandra terminalis</em>)</td>
<td>53</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>PLANT</th>
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<tbody>
<tr>
<td>Cockscomb (<em>Celosia argentea cristata</em>)</td>
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</tr>
<tr>
<td>Cockscomb (plume) (<em>Celosia cristata plumosa</em>)</td>
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</tr>
<tr>
<td>Geranium (<em>Pelargonium hortorum</em>)</td>
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<tr>
<td>Big Leaf Wintercreepers (<em>Euonymous fortunei vegetus</em>)</td>
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<tr>
<td>Avocado (<em>Persea americana</em>)</td>
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<tr>
<td>Banana (<em>Musa paradisiaca sapientum</em>)</td>
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</tr>
<tr>
<td>Coconut (<em>Cocos nucifera</em>)</td>
<td>57</td>
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<tr>
<td>Walnut–Persian (<em>Juglans regia</em>) (leaf)</td>
<td>64</td>
</tr>
<tr>
<td>Brussels sprout (<em>Brassica oleracea gemmifera</em>)</td>
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</tr>
</tbody>
</table>
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