PLANT PROPAGATION
For Master Gardeners
By Cynthia Edwards
Plant Propagation

Two types:

Sexual and Asexual
Sexual Reproduction

1. Ferns
Sexual Reproduction

1. Ferns
2. Gymnosperms
Sexual Reproduction

1. Ferns
2. Gymnosperms
3. Angiosperms
Magnified Pollen
Flowering Parts

Basic Flower Structure

Flower Parts:
- Pedicel/Peduncle
- Receptacle
- Perianth
- Calyx
- Sepal
- Corolla
- Petal
- Tepal
- Androecium (Stamen, Filament, Anther)
- Gynoecium (Stigma, Style, Ovary)

Geranium

Tiger Lily

Magnolia
Advantages of Seeds

- Quicker
- Cheaper
- Less disease transmission
- Crossbreeding = new varieties
Seed Structure

- Seed coat
- Cotyledon
- Shoot apex
- Root apex
- Endosperm
Seeds
Germination
Environmental Factors

1. Water
2. Oxygen
3. Light
4. Temperature
Storage of Seeds

Low Temperature (40 F)
Low Humidity (under 40%)
Dormancy

What keeps a healthy and viable seed dormant? And what can we do to change that?

Chemicals
Structures
Hard Seed Coats

Scarification
Hot water soak
Acid soak
Breaking chemical dormancy

Cold Seed Stratification
Pre-treated Seeds
Germinating: Media and Containers
Planting Medium

1. Lightweight and fine
2. Sterile
3. Holds Moisture
4. Drains Easily
5. Insect Free
6. Weed seed Free
Containers
Seed Starting

- Timing
- Appropriate depth
- Consistently moist soil
- Light
- Thinning
- fungus
Transplanting

- Hold by TRUE leaves
- Lift out of soil
- Gently repot at same depth
- Water
Hardening off

**Purpose:** to slow plant growth and mature the plant cells.

**Period of Time:** two weeks

**Process:** gradual
Seed Collecting
Asexual Propagation = Vegetative Propagation

**Vocabulary**

**Crown**: the area where the stem meets the roots, usually at soil level

**Node**: the area of the stem where a leaf is attached

**Internode**: the stem region between the nodes

**Petiole**: the stalk that attaches a leaf to a stem

**Axil**: the angle between the petiole and the stem

**Axillary buds**: a bud located in an axil

**Terminal bud**: the bud located at the end of a stem
Specialized stems and roots

- Runners
- Rhizomes
- Stolens
- Bulbs
- Corms
- Tuberous Stem
- Tuberous Root
Runners
Rhizomes and Stolens
Bulbs
Corms
Tubers
Separation vs. Division
Offsets
Vegetative propagation
Reasons for Vegetative propagation

1. Preserve an unusual characteristic
2. Cost
3. Time Savings
Conditions for successful cuttings

- Take cuttings early in the day
- Maintain humidity
- Sharp, sterile tools
- Healthy plants
- Not in bloom
Propagation Setup

Misting systems:
Oklahoma cooperative extension
North Carolina cooperative extension
Rooting medium

- Perlite
- Coarse sand
- Vermiculite
- Peat moss
Cuttings:

Rooting a severed part of a plant.

1. Leaf cuttings
2. Stem cuttings
3. Root cuttings
Leaf Cuttings

- **Whole Leaf with Petiole**
- **Whole Leaf without Petiole**
- **Split Vein**
- **Leaf Section**
Cacti and Succulents
Stem Cuttings

- **Hormones**
- **Differentiate cells**
Softwood 
Stem Tip 
Cuttings
Semi-hardwood stem cuttings
Hardwood stem cuttings
Hardwood Stem Cuttings of Needled Evergreens
Cane cutting
Root Cuttings

Plants with large roots

Plants with small roots
Layering

Rooting a part of the parent plant,

Then severing it.
Tip Layering
Simple Layering
Compound Layering
Air Layering
Mound Layering
Budding and Grafting

Joining two parts of separate Plants into one plant.
Grafting

1. The scion and the rootstock must be compatible, two species from the same genus.
2. They must be at the proper physiological stage.
3. The cambial layers of the two parts must meet, lining up perfectly.
4. The graft union must be kept moist until the wound has healed.
Tools for grafting

- Pruning shears
- Sharp knife
- Grafting wax
- Rubber bands
- Rubbing alcohol to sterilize
Splice Graft
Whip or Tongue Graft

A long, sloping cut 2.5 to 6 cm (1 to 2½ in.) long is made at the top of the stock.

A second downward cut is made starting one-third of the distance from the tip to the base of the first cut. Pulled apart it looks like this.

A long, sloping cut is made at the base of the scion the same length as the cut on the stock.

A second cut is made under the first, just as for the stock.

The stock and scion are slipped together, the tongues interlocking.

The graft is then tied and waxed.
Saddle Graft
PREPARING THE STOCK

The stub is split several cm (in.)

PREPARING THE SCION

The scion is made by cutting a long, gradually tapering wedge.

A smooth straight-grained section should be used so the split will be even.

The outside edge of the wedge should be slightly thicker than the inside.

INSERTING THE SCIONS INTO THE STOCK

The split in the stock is held open by a wedge for insertion of the scions.

Two scions are inserted in a stub, one at each end of the split. The scions must be carefully placed so the cambium layers match.

After the scions are properly placed, the wedge is withdrawn. The entire union, including the tips of the scions, is then thoroughly covered with grafting wax.

Cleft Grafting
Bark Graft
Budding

Taking a single bud and grafting it on.
Patch Budding

Patch Bud
Chip Budding

Chip Bud

Scion  Rootstock
**T-Budding**

A vertical cut about 2.5 cm (1 in.) long is made in the stock.

Starting about 1.2 cm (½ in.) below the bud, a slicing cut is made under and about 2.5 cm (1 in.) beyond the bud.

Front view

Side view

A horizontal cut is made through the bark about one-third the distance around the stock. The knife is given a slight twist to open the two flaps of bark.

About 2 cm (¾ in.) above the bud a horizontal cut is made through the bark and into the wood, permitting the removal of the bud piece.

**INSERTING THE BUD INTO THE STOCK**

The shield piece is inserted by pushing it downward under the two flaps of bark until the horizontal cuts on the shield and the stock are even.

The bud union is then tightly tied with some wrapping material.
Bibliography