When and how cuttings are taken

1. Choosing stock plant
   - young, actively growing
   - pest and disease free
   - "sloppy collecting" for restoration

2. Types of cuttings
   - stem, leaf, root
   - stem: hardwood, semi-hardwood, softwood/herbaceous
   - typically (not always) from terminal end of shoot

A. Hardwood cuttings
   - taken in dormant season from previous season's growth
   - sometimes older wood
   - 4 to 12" (or longer for some spp.)
   - pencil thick
   - at least two nodes
   - straight, heel, mallet

B. Semi-hardwood
   - taken in late summer, early fall
   - broadleaf evergreens
   - terminal or lateral branches
   - 3 to 6"
   - some leaf area may be removed for space, reduced H2O loss

C. Softwood
   - soft, succulent, herbaceous growth
   - woody or herbaceous plant species
   - same season's growth

3. Time to take cuttings
   - broadleaf evergreens: late summer/fall
   - conifers: winter
   woody deciduous and herbaceous:
     - mid-summer
     - when new growth is hard enough to stick
     - varies by species and weather
     - in the morning
4. Storage
   - immediately kept moist and cool
   - wrapped in wet burlap, towel, newspaper
   - cool, dark; refrigerator
   - may store for a few days

5. Procedure
   - cut stock long, final cut when sticking
   - prudent pruning
   - when ready, cut to 3 to 5"
   - at least two nodes, one at top, one at bottom
   - remove leaves from lower half
   - reduce leaf size if necessary
   - wound at lower 1/2"
   - dibble
   - plant securely

6. Container
   - liners or gallons for quick, easy species
   - no container
   - flats

7. Media
   - sand, peat, perlite, pumice, vermiculite, pea gravel, marbles
   - individually or in mixes
   - depends on species and after planting culture

8. Hormone
   - auxin: IBA or NAA
   - powder or liquid
   - must be kept fresh
   - various strengths

9. Fungus treatment
Post-planting environmental control

1. Light
   - affects temperature
   Shadecloth: varying mesh size, % light reduction
     - depends on structure, crop, humidity, weather

2. Ventilation
   - important for temperature regulation, fungus/disease
   - temperature layering
   - fan jet tubes
   - exhaust fans/louvers
   - interior fans
   - thermostats

3. Temperature
   General goals: bottom heat, top cool
   Bottom heat
     - hot water tubes (in, under bed)
     - electric cables
     - propagation mats
     - thermostat with sensor in media
     - decomposing organic matter

   Cooling
     - evaporative cooling

4. Humidity (mist systems)
   A. Water source
     - low pressure generally not a problem, may have to reduce
       - filters
   
   B. Solenoid valve
     - flow control
   
   C. Mist heads
     - deflection types
     - drip mist heads
     - piping/mounting
D. Controllers

Time clocks
- standard irrigation controllers not suitable
- hours of operation, minutes/seconds between watering, seconds of watering
- expensive

Electronic leaf
- two electrodes imbedded in non-conducting surface
- placement is critical
- salts in water will build up, conduct electricity

Weight system (Mist-A-Matic)
- stainless steel screen collects water, turns off solenoid
- adjustable with balance