

Propagation: Garden-variety Math Divide it, take cuttings, seed, it's all multiplying!

The basic techniques

I. Seed

- A. Fresh, clean seed most likely to germinate
- B. Dormancy common: Safeguard against growing too soon/wrong season
 1. Growth inhibitors may be chemical, physical (hard coat), seasonal
 2. Know the inhibition to overcome or shorten dormancy
 - Sprouting in moist toweling saves space in interim
- C. Sterile pots, soilless mix, lights... or direct sow
- D. Critical period: soon after seedlings emerge. Avoid damping off
- E. Barriers:
 1. Will it be a clone? (No! So what? Often gain variation and vigor.)
 2. They're spindly! (Thermostat down lights UP!)

II. Cuttings, because wounded nodes in the dark turn stem cells into roots

- A. Leafy/budded shoots. Cover node with moist, well drained soil
 1. Softwood: Green, soft new growth
 - 3" pieces, 4-6 leaves, pull off 1 or 2 at base
 2. Semi-ripe (semi-hardwood): Midway to mature growth; firm at base
 - Perhaps longer pieces but still 4-6 leaves
 - 5 to 25 weeks to root, by species and conditions
 3. Hardwood: Woody plant finished for season, buds set for spring.
 - Often simplest, can be "stuck" outdoors
- B. Main stem/trunk cuttings of houseplants, tropicals.
 - 2" or more, 2+ nodes
 - Half-bury, horizontally, with at least one node pointed up
 - Stick vertically, with one node just above surface
- C. Root cuttings from plants with running roots or thickened tap roots
 - Thick bit, right side up, "stick it" vertically just below surface
- D. Leaf cuttings, usually from fleshy-leaf plants
 - "Stick" leafstalk or pin leaf firmly flat. Plants form at vein/soil union
- E. Layering and air-layering to root "cuttings" while still attached to parent
 1. Wound the limb
 2. Wrap with or weight down against moist soil until roots form
- F. Barriers
 1. Too long, too many leaves, too much wood!
 2. Air too dry. Tent it!

III. Grafting, because live cambium layers can knit together

A. Not so difficult as it seems

1. Compatible rootstock and scion
2. Cambiums together
3. Securely fastened until new stem growth unites the graft

B. Wood-to-wood or "budding:" bud-with-woody base inserted under bark

IV. Division, giving naturally-occurring pieces their own space

- It's a perfect time for this simple cloning; so more detail in a bit!

V. Micropropagation: TC "tissue culture," quantity more quickly

- Widely used commercially, requires sterile lab, custom petri-dish media
- Gardeners should know what's TC, recognize possible lack of vigor

Advice that applies with all methods

I. Propagate from healthy, typical plants

A. Diseased or insect-infested cuttings not likely to survive

B. Odd growth may indicate pests/virus or genetic mutation

C. Growth habit of a cutting/division/tissue may become habit of offspring

- Dwarf, pendulous, variegated "cultivars"

II. Keep it clean: Tools, pots, potting media

- Clip away damaged or decayed plant parts

III. Maintain the plant's orientation: Plants know "up"

- Retain leafy tips whenever possible - tip regulates root growth

IV. Heat the bottom; keep the top cool and bright

- 70°F at the bottom really speeds rooting
- Avoid hot sun on leafy tops, or use full spectrum cool fluorescent

V. When top grows vigorously, bottom's probably rooted well

It's that time! Early spring, early fall: Divide those perennials

I. That's *indoor* as well as outdoor perennials. Not "only-" but best time.

II. Knowing when a plant's reached a size/age to be divided

- A. The plant gives signals: Smaller leaves, less bloom, weak center
- B. *You* may decide you need more, want more, want to move/change

III. How often? Why now?

A. Outdoors, average 4-5 years to maintain size, youthful vigor, health

1. Keeps plants from overgrowing an area or becoming ungainly
 - Some almost too big and tough to divide if left longer
 - May prevent dying out in middle, flopping open before bloom
2. Keeps in check: Root insects, fungal- and bacterial diseases
3. Indoors, by growth rate, allowable pot size...

B. Divide right before a growth spurt

1. Spring or fall, when soil is warmer than air
 - Then, roots grow rather than top
 - Might go by bloom season: Fall bloomers in spring and vice versa
3. *Can* divide anytime. May need follow-up pampering shade, water

C. Some average outdoor perennials (divide every 4-5 years):

- Bee balm (*Monarda didyma*)
- Black-eyed Susan (*Rudbeckia*)
- Daylily (*Hemerocallis*, esp. repeat blooming cv's)
- False sunflower (*Heliopsis scabra*)
- Hosta (*Hosta* species and varieties)
- Iris (*Iris germanica* hybrids, *I. sibirica*, others)
- Ornamental grasses: maiden, fountain, feather reed, blue fescue
(*Miscanthus sinensis*, *Pennisetum alopecuroides*,
Calamagrostis acut. stricta, *Festuca ovina glauca*, others)
- Tall sedum (*Sedum* / *Telephium spectabile*)

D. Divide more often (every 2-3 years):

- Daisy (*Leucanthemum superbum*)
- Mum (*Chrysanthemum x morifolium*)
- Coral bells (*Heuchera sanguinea*, *Heuchera* hybrids)
- Aster (*Aster novae-anglaie*, *A. novae-belgii*)
- Golden Marguerite (*Anthemis tinctoria*)
- Coreopsis (*Coreopsis lanceolata*, *C. verticillata*)
- 'Blue/White Clips' bellflower (*Campanula carpatica*)
- Tall phlox (*Phlox paniculata* and *P. maculata*)
- White/pink/red yarrows (*Achillea millefolium*)

E. Divide infrequently or not at all

1. Long lived species, can stay in one spot a long time
 - Still, no denying bigger/better blooms on young plants
2. May have reputation "don't disturb" - misleading
 - Gas plant (*Dictamnus purpureus*)
 - Peony (*Paeonia lactiflora*)
 - Bleeding heart (*Dicentra spectabilis*)
 - False indigo (*Baptisia australis*)
 - Balloon flower (*Platycodon grandiflorus*)
 - Windflower (*Pulsatilla vulgaris*)
 - Hardy hibiscus/swamp mallow (*Hibiscus moscheutos*)
 - Perennial geranium (*Geranium sanguineum*, *G. cinereum*, others)

IV. How to divide

A. Learn types of roots

1. Surface-running , such as *Ajuga*, bee balm
2. Runs below surface: Japanese anemone, ostrich fern
3. Tap roots (primary, central vertical): balloon flower, windflower
4. Offsets (expanding crown): daisy, aster, hosta, peony, daylily
5. Woody, sub-shrub: lavender, sage, pinks, creeping phlox

B. Tools

1. Spade and or fork, for digging out and replanting
2. Spade, 2 forks, sharp knife or ax for dividing
3. Hose or bucket for rinsing off roots and watering-in

C. Handling the plant

1. Lift it, begin digging at drip line
2. Identify growing eyes or sections
Rinsing off the roots can be helpful, at least first time
Three growing points makes a garden center's 8" pot
3. May be best to discard the center, oldest part
4. Slice to divide
 - Clean cuts seal best (like clipping back torn cuticle on your finger)
 - Dusting with fungicide not essential if replanting right away
 - No need to cut back (even the flowers), and can be harmful to significantly reduce foliage in high summer
5. Replant
 - Soak in water before replanting
 - Must hold? Put in cool place where won't dry out
(in garbage bag on cold cement floor, can last weeks, months!)
 - Renew *and level* soil if replanting in same spot
 - Spread roots naturally, wide
 - Plant at same depth was previously growing
 - Water in well
 - Protect if moved "out of season"
(shade it, give wind screen, stake or mulch heavily)

V. Most-asked questions about dividing

- A. The books say divide it in (certain month)
 1. May be reason it's best then:
 - Insect control in iris
 - Peony less brittle, less disease spread into broken roots in fall
 2. But other times not ruled out. Do what's best for *you*!

- B. The books say "don't disturb it" or it "resents disturbance."
 1. Proceed with care but don't be scared off
Some warnings based on one (influential) gardener's bad experience repeated until it becomes "fact."
 2. Plant may sulk after the move

- C. Must I lift the whole plant?
 1. No, but good idea to do it at least occasionally
 2. Always worth it for the rapid increase and better bloom of divisions
 3. Consider: If continually take away the outer pieces, as to keep
 - fast-spreaders in place or get starts of a slow but desirable plant, will be left with only the old, least vigorous center.
 - Will remainder be centered in the spot where it belongs?

- D. Should I worry about disease and insects spreading?
 1. Yes, if original plant had a *significant* problem
 - Beneficial insects, fungi and bacteria can also move with divisions
 2. Preventive measures:
 - Rinse roots and crown thoroughly
 - Clip top back if reducing chance of carrying insects/eggs
 - Discard distorted, rotted, suspect sections
 - Don't divide/don't take plants suspected of viral problems or root/stem nematodes. Viral - watch for distorted growth, discolored tissues that don't die. Nematodes - watch for distorted roots & stems

Recommended reading: in order from for everything and everyone to serious specialist

American Horticultural Society Plant Propagation

Alan Toogood, Ed.; Dorling Kindersley, publ.

Asking About Asters: Complete Library of Macunovich How-to

CD, 1,200+ printed, illustrated pages of advice; JMaxGarden@aol.com

Propagation: Fine Gardening How-to Series

CD, Includes video of Janet Macunovich on Division; FineGardening.com

Park's Success With Seeds

Ann Reilly; Park Seed (o.o.p. - buy used!)

The New Seed-Starters Handbook

Nancy Bubel; Rodale Press Inc., publ.

Seed Germination Theory and Practice

Norman C. Deno, 139 Lenor Dr., State College PA 16801

Plant Propagation: Principles and Practices

H. T. Hartmann, D. E. Kester, F. T. Davies, R. L. Geneve; Simon & Schuster, publ.