

Introduction to Horticulture

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An overview of the science, practice, and significance of growing plants for food, beauty, and health.

1. What Is Horticulture?

Aspect	Description
Definition	The art, science, and business of cultivating fruits, vegetables, ornamental plants, and medicinal herbs.
Scope	Includes plant breeding, propagation, production, post-harvest handling, landscape design, and plant health management.
Goal	To produce high-quality, sustainable plant products while enhancing environmental and human well-being.

2. Major Sub-Disciplines

Sub-discipline	Focus	Typical Activities
Pomology	Fruit crops	Orchard design, thinning, harvesting
Olericulture	Vegetables	Bed preparation, spacing, pest control
Floriculture	Flowers & ornamental foliage	Cutting production, greenhouse management
Landscape Horticulture	Public & private green spaces	Plant selection, irrigation design, maintenance
Post-harvest Technology	Storage & processing	Cooling, packaging, shelf-life extension
Plant Breeding & Genetics	Developing new varieties	Hybridization, marker-assisted selection
Horticultural Therapy	Health & well-being	Therapeutic gardening programs

3. Basic Plant Biology for Horticulturists

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1. **Photosynthesis** – Light energy → chemical energy (glucose).
 2. **Transpiration** – Water movement from roots to leaves; drives nutrient uptake.
 3. **Growth Regulators** – Auxins, cytokinins, gibberellins, ethylene, abscisic acid.
 4. **Reproduction** – Sexual (seeds) vs. asexual (cuttings, grafting, tissue culture).
 5. **Soil?Plant Interactions** – pH, texture, organic matter, microbial symbioses.
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4. The Horticultural Production Cycle

1. Planning & Site Selection

- Climate suitability (temperature, frost dates).
- Soil testing (pH, nutrients, drainage).

2. Propagation

- Seed sowing, stratification, scarification.
- Vegetative methods: cuttings, layering, division, grafting.

3. Establishment

- Bed preparation, mulching, irrigation set?up.
- Plant spacing and trellising.

4. Crop Management

- Fertilization (soil vs. foliar).
- Integrated Pest Management (IPM): scouting, biological controls, targeted chemicals.
- Pruning, training, thinning.

5. Harvest & Post?Harvest

- Timing for optimal quality.
- Cooling, cleaning, grading, packaging.

6. Marketing & Distribution

- Direct sales (farmers markets, CSAs).
 - Wholesale channels (grocery, restaurants).
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5. Sustainable Horticulture Practices

Practice	Benefit
Crop Rotation & Diversity	Reduces disease pressure, improves soil health.
Cover Crops & Green Manures	Adds organic matter, fixes nitrogen, suppresses weeds.
Drip Irrigation & Soil Moisture Sensors	Saves water, reduces runoff.
Compost & Organic Amendments	Enhances structure, microbial activity.
Biological Pest Control	Lowers pesticide residues, supports biodiversity.