



chicago botanic garden

# Garden for Life

## Designing your own barrier-free garden

Gardening remains one of America's most popular pastimes. A garden can be a meaningful way to have nature close at hand and enjoy the value of vine-ripe vegetables, colorful flowers, or a well-landscaped home. However, for the 60 million Americans who have a disability, traditional in-ground gardening may be too challenging. Rethinking garden design and techniques can enable anyone of any ability to garden safely and comfortably for a lifetime.

### Universal garden design

Universal design, a term created by the late architect Ron Mace, ALA, is a philosophy used to design products, environments, and forms of communication that are usable by nearly all people, without the need for adaptation or specialized design. Universal design principles provide a foundation of ideas and practical pointers for creating safe, comfortable gardens that are accessible to all.

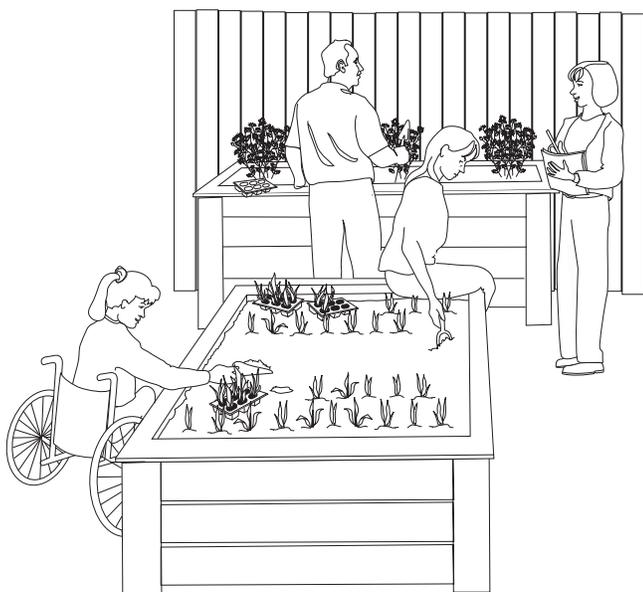
### Seven universal design principles

Mace and a team of universal-design advocates created a checklist of seven design principles. Using this list as a reference during a garden's planning process helps to create a barrier-free garden. These principles may also be useful when evaluating an existing agency or home garden that requires updating to meet the current and future abilities of its users.

#### Principle one: **EQUITABLE USE**

Universal design allows diverse populations to use the same spaces despite varying needs and abilities. To create practical and marketable gardens, designers must use a variety of inclusive elements.

- Provides the same means of use for all users; identical when possible, equivalent when not
- Avoids segregating or stigmatizing any users
- Offers a comfortable level of privacy, security, and safety
- Makes the design appealing to all users



Environments that incorporate universal design principles work better for everyone.



Devices such as this kneeler maximize independence.

### Principle two: FLEXIBILITY IN USE

Universally designed gardens should accommodate a variety of individual preferences and abilities. This means providing opportunities for participants to choose how they accomplish their varying garden tasks, whether sitting or standing, right- or left-handed, fast-paced or methodical.

- Provides choice in method of use
- Accommodates right- and left-handed access and use
- Provides adaptability to the user's pace

### Principle three: UNIVERSAL DESIGN MUST BE SIMPLE TO UNDERSTAND AND EASY TO USE

- Eliminates unnecessary complexities
- Is consistent with users' expectations and intuition
- Provides effective prompting for sequential actions

### Principle four: PERCEPTIBLE INFORMATION

Universal design effectively communicates necessary information to the user regardless of ambient conditions or the user's sensory abilities.

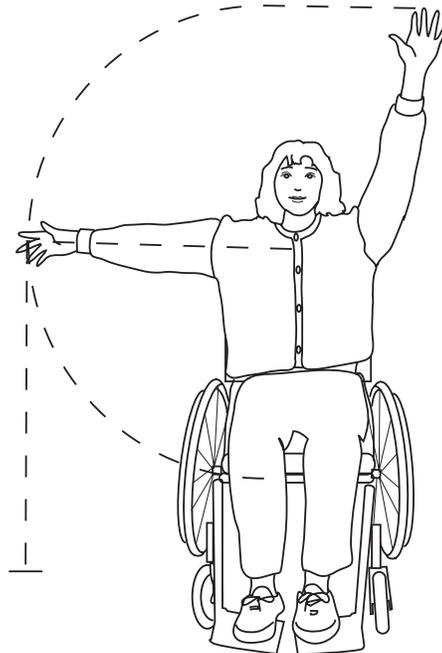
- Accommodates a wide range of language and literacy skills (signage made with illustrations and symbols as opposed to written language)
- Arranges information according to its importance

- Differentiates elements in ways that make it easy to give instructions or directions
- Provides compatibility with a variety of techniques or devices used by people with sensory limitations
- Provides feedback after a task is complete

### Principle five: TOLERANCE FOR ERROR

Universal design minimizes hazards and the adverse consequences of accidental or unintended actions. The garden is designed to be a safe environment with easily definable routes to, from, and within it. When you are in the garden, you should be able to readily orient yourself to where you are in relation to other buildings and landmarks.

- Arranges a garden so that the most frequently used elements are the most accessible (garden tools, water sources, access to higher-maintenance plant materials)
- Provides warning; eliminates or isolates hazards
- Provides fail-safe features (e.g. smooth paving)



Universal design takes into consideration the reach of people sitting or standing.



## Principle six: LOW PHYSICAL EFFORT

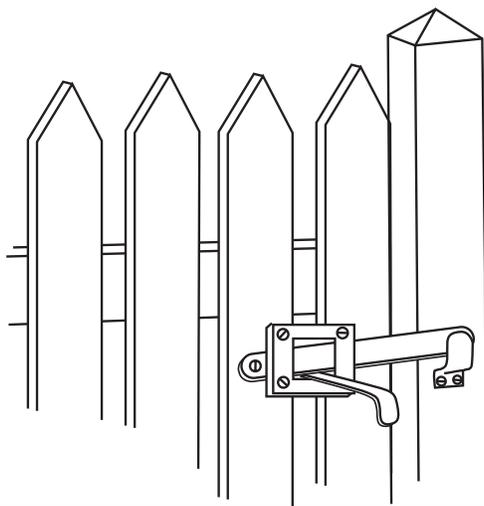
Universal design can be used to maximize abilities and reduce effort in a safe, comfortable setting.

- Allows a user to maintain comfortable body position (e.g. gardening areas are placed within easy reach of all users)
- Uses reasonable operating forces (e.g. all doors, gates, and latches should require minimal force)
- Minimizes repetitive action and sustained physical effort. Garden is designed to encourage the user to change tasks and physical positions while working in the garden

## Principle seven: APPROPRIATENESS OF SIZE AND SPACE

With universal design, consideration is given to ease of approach, reach, and use, regardless of the user's body size, posture, or mobility. This principle can be reflected in designs that use such elements as lower see-through walls and fences.

- Provides a clear line of sight to important elements (e.g. entrance, exit, bathroom, etc.)
- Makes it comfortable for any seated or standing user to reach all components
- Provides adequate space for the use of assistive devices or personal assistants



**Levers in place of knobs reduce the effort of opening garden gates.**

## Designing your barrier-free garden

If you are designing for your own use or for a specific gardener, use these guidelines as they pertain to your needs. If you are planning a garden for more general use, try to eliminate barriers for all sorts of users.

Using the principles of universal design, the first step in designing your barrier-free garden is assessing your needs and abilities. What kind of gardening do you want to do? How much time do you have? Do you use a wheelchair, scooter, cane, or walker? Do you tire easily? Do you have vision problems? Is it difficult for you to bend over or to get up from or down to the ground? Challenges like these can be solved with special techniques. Identify your needs so that you can create a customized barrier-free garden that enables you to garden for as long as you wish.

### Garden access

If you are going to garden, you must be able to get to the garden. And once you get there, you need to be able to get around as easily as possible.

If you have limited mobility or want to save energy, choose an area near the house for frequently visited garden areas. For example, there is no point in locating the vegetable garden far away if you are exhausted by the time you get there! And simplify chores in remote, less-tended areas by using low-maintenance plants.

If you use a wheelchair, cane, or walker, plan for paved pathways that are level, smooth, and firm. As you consider adding paving, the following information will help you evaluate the various options. Regardless of the paving surface material you choose, it should offer the following:

- Excellent traction
- Good drainage
- Low maintenance
- Smooth, level, and firm ground
- Grades on slopes not to exceed 5 percent. A 1-foot rise would be the maximum for 20 feet of length
- Joints between paving materials minimized to avoid catching cane tips or wheels



- Appropriate width. Eighteen inches accommodates one person walking or one-way traffic; 5 feet provides space for two people walking side by side; 3 feet is required for a wheelchair user (one-way traffic); 6 to 7 feet allows two wheelchairs to pass one another. Patio areas should be large enough to allow plenty of maneuvering room after plant containers and furniture have been placed.

## Design tips for paths and patios

Designing a successful home garden involves a considerable investment in thought, time, and money. Keep these pointers in mind when you plan and install paving material:

- Design direct routes through the garden or circular routes that come back to the same starting point to help those who are easily disoriented and those with limited vision.
- When laying brick or other small pavers, use of running patterns helps lead one along the path.
- Avoid dead-end paths that do not offer a clear direction to proceed.
- Offer a sharp textural contrast at the edge of a path, such as asphalt with grass or crushed stone with soil. This helps people with low vision recognize when they are off the path. Raised edges on paths are not recommended because of the hazard of tripping.
- Use a support railing along sloped paths and for those easily disoriented or with poor balance.
- Build in textural and visual contrasts, using color or material as a cue, for people with vision impairment.
- Be careful, however, as a sharp contrast in color may look like a stair step to someone with poor vision.
- Provide for larger, more open patio areas for plant containers and patio furniture. Careful placement allows ample freedom of movement for the gardener.
- Consider color carefully. In full sun, white concrete creates glare, which is uncomfortable for some people. Concrete can be tinted for a modest increase in cost. Black asphalt absorbs heat, which can make the midday summer garden unbearable, but in winter the dark color melts snow and ice more quickly.
- Evaluate the resiliency of surface materials for cushioning falls. Newer rubberized paving materials used around pools and in play lots are firm enough for wheelchairs and also cushion falls. A drawback of such

materials is their expense.

**Review the chart on page 8, which evaluates aspects of various paving materials.**

## Adapting the garden: a place for your plants

Raised beds, containers, or vertical gardens may be necessary to position the soil and plants at the height that's most comfortable for you.

For those using wheelchairs, walkers, or who have poor coordination and balance, containers and other planting areas must be on or adjacent to paving.

Ensure that the container is stable enough that it will not tip over if leaned on or grabbed to prevent a fall. At raised heights, frequent chores such as harvesting your vegetables or picking bouquets of flowers are a snap.

How high should your garden beds or containers be? If you want to garden while sitting in a chair or using a wheelchair, a soil level 2 feet high works for most people who garden to the side of where they are sitting. Be sure your raised bed has an area to accommodate your knees if you would like to pull up to your garden head-on. Depending on your size, you might prefer a garden bed as low as 18 inches or as high as 30 inches.

If you want to garden standing up without bending, a height of 24 to 41 inches is best, depending on your height. The sides of raised beds and containers should normally be as thin as possible, so you will not have to reach too far to access your plants or soil.

If you can reach your garden bed or container from the front only, it should be no more than 30 inches from front to back. If you can reach it from both front and back, the width can be up to 5 feet. A round container reachable from all sides should be no more than 5 feet in diameter.

For your raised containers or beds, you will want to use durable materials that are easy to maintain and don't require painting. Landscape timbers, masonry, wood, fiberglass, plastic, and metal are all good choices for holding your soil above ground level. If you choose wood, use one that is naturally rot-resistant, such as cedar. Avoid pressure-treated wood or used railroad ties, particularly if you plan to grow food crops, because the materials used to treat the wood are toxic and may be harmful to some people.

Make your planting areas as large as possible but still within easy reach. Bigger beds not only give you more



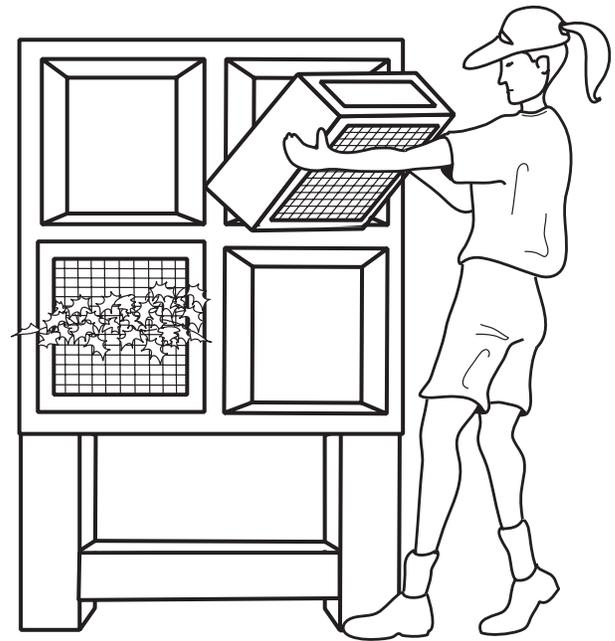
growing room but also require less watering because they don't dry out as quickly as smaller containers. You will want containers or beds to be heavy enough so they won't tip over in the wind and will allow you to lean against them for support if necessary.

## Vertical gardening

One great way to position plants within easy reach while saving valuable space is to use vertical gardening techniques. Vertical gardens take advantage of structures such as fences, walls, and roof overhangs to support plant containers at the most comfortable height for the gardener, whether seated or standing.

Vertical gardening methods not only promote easy tending but also clearly outline planting areas for people with low vision.

Vertical wall gardens make gardening areas accessible and define space for people with low vision.



**Vertical wall gardens make gardening areas accessible and define space for people with low vision.**

### SOIL TIP

Fill your large containers or raised beds with soil that is loose, light, and well-drained. Regular field soil is too heavy for plants to thrive in and takes too much energy to work. You can make a great, inexpensive, lightweight mix that is easy to work. Mix equal volumes of topsoil, sharp sand, and compost or peat moss. Substitute coir for peat moss for a more sustainable alternative. For smaller containers, hanging baskets, and vertical wall gardens, purchase a good quality soilless potting mix made especially for container gardening.

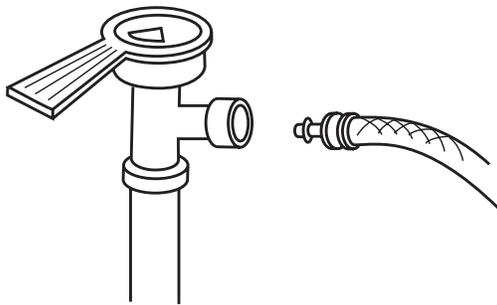
## Watering adaptations

Many people find watering with hose in hand to be a relaxing gardening task. It is more challenging for anyone with a mobility impairment, particularly people who use wheelchairs, crutches, or canes. Beyond selecting drought-tolerant plants and mulching to reduce evaporation, one can make watering easier and more enjoyable with the following techniques:

- A spigot near your garden is essential. For easy reaching, it should be 2 to 3 feet off the ground. Replace round handles with levers to make it easier to turn the water on and off.
- Top-quality hoses and leak-proof connections are worth the extra cost for the work and aggravation they save. If your garden is big, consider duplicate hoses instead of lugging hoses from one spot to another.



- A long-handled watering wand is an easy way to extend your reach. An on-off valve at the end of the hose gives total control without requiring running back and forth to the spigot; it also saves water when you move from bed to bed. Soaker hoses deliver water slowly to plants' roots without getting the leaves wet, thus decreasing the chance of foliage disease. Heavy-duty snap connectors on each hose and watering tool make equipment changes a breeze.
- You might even want to consider an automated watering system with a timer. It can save work, but it is expensive. And such systems require frequent adjustments and maintenance.



**A water spigot that is raised is more accessible, and a lever handle makes it easy to use.**

## Adapting the gardener: tools of the trade

Many new tools on the market today make gardening tasks much easier. There are also many ways you can adapt tools to meet your own needs. For example, if reaching or bending is difficult, choose long-handled or lightweight tools for more comfortable gardening.

## Selecting your plants

Once your raised containers or beds are in place, you're ready for the easy part: choosing what to grow.

Today's gardeners can choose from an ever-increasing palette of plants, from rare natives once common in the wild to the latest version of the plant breeder's art. You can grow everything from the tallest giants to dwarf varieties that are tiny enough to tuck into the smallest niche.

In most barrier-free gardens, you will want to make the most of every square inch. If you are growing vegetables, for example, you probably won't have room for space hogs such as pumpkins and potatoes. But you can reap a large, long-lasting harvest from productive vegetables such as bush beans and patio-type tomatoes. Look for varieties that have been bred to grow in containers.

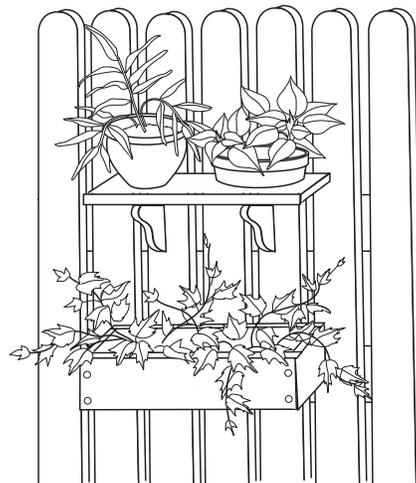
Consider plants that have unique sensory qualities, such as fuzzy leaves, fragrance, year-round visual interest, or the ability to attract butterflies. Careful plant selection downplays senses that may be impaired to emphasize others. Remember, too, that tall plants in raised beds or containers are apt to be unreachable when they are mature. These are still best planted at ground level.

For additional information on selecting plants, see our "Garden for Life: Plants for the Senses" publication.

## In summary

With minor adaptations to both garden design and the way we garden, these and many other rewards of the garden are readily achievable for anyone. Perhaps some of the ideas here will enable you or someone you know to enjoy gardening—a pleasure no one should have to give up.

To experience the principles of universal design applied to a garden, visit the Chicago Botanic Garden's Buehler Enabling Garden. Here—among the 20 containers, 24 hanging baskets, six vertical wall gardens, and 775 square feet of garden beds raised 18 inches or higher from ground level—gardening is accessible to all.



**On shelves or in window boxes mounted on a fence, plants are within easy reach.**



## Chicago Botanic Garden resources

Visit the Chicago Botanic Garden's Buehler Enabling Garden, an 11,000-square-foot teaching garden displaying an array of techniques that encourage gardening for people of all ages and abilities.

For details on upcoming horticultural therapy events and programs, resources, and consultation on therapeutic gardening and garden design, contact the Chicago Botanic Garden at (847) 835-8277.

Visit [chicagobotanic.org/therapy](http://chicagobotanic.org/therapy) for additional information about the Chicago Botanic Garden Horticultural Therapy program.

## References

- Cassidy, P. *The Illustrated Practical Guide to Gardening for Seniors: How to Maintain Your Outside Space with Ease into Retirement and Beyond*. Lanham, MD: Lorenz Books, 2011.
- Pierce, J. and Barnsley, R. *Easy Lifelong Gardening: A Practical Guide for Seniors*. North Pomfret, VT: Trafalgar Square Publishing, 1993.
- RL Mace Universal Design Institute. *Principles of Universal Design*. Retrieved from <http://udinstitute.org/principles.php>, 2015.
- Woy, J. *Accessible Gardening*. Mechanicsburg, PA: Stackpole Books, 1997.

## Recommended reading

- Adil, Janeen R. *Accessible Gardening for People with Physical Disabilities: A Guide to Methods, Tools, and Plants*. Bethesda, MD: Woodbine House, 1994.
- Marcus, Clare Cooper and Sachs, Naomi. *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces*. Hoboken, NJ: Wiley Publishing Co., 2013.
- Rothert, Gene, HTR. *The Enabling Garden: Creating Barrier-Free Gardens*. Dallas, TX: Taylor Publishing Co., 1994.
- Yeomans, Kathleen. *The Able Gardener: Overcoming Barriers of Age and Physical Limitations*. Pownal, VT; Storey Communications, 1992.



**References: Evaluating paving materials**

Paving Materials	Good drainage	Good traction	Firm, level	Low-maintenance	Long-lasting	Attractive	Cool	Non-glare	Inexpensive	Cushions falls	Comments
Turf grass	x	x				x	x	x	x	x	Turf grass can hide uneven areas and is too soft for wheelchairs and scooters.
Wood chips	x	x				x	x	x	x	x	Wood chips must be renewed and are too soft for wheelchairs and scooters.
Decomposed granite	x	x	x		x	x	x	x			This material may develop ruts that must be periodically raked smooth.
Stone pavers	x	x	x	x	x	x		x			There are many choices in color, shape, and pattern, ranging from colored concrete to quarried stone or brick. Pavers must be properly installed on a prepared base.
Asphalt	x	x	x					x	x		Asphalt must be sealed periodically. Uneven places that hold water should be avoided.
Concrete	x	x	x	x	x						Concrete can be textured and/or colored to reduce glare.
Wood	x	x	x		x	x	x				Wood may stay damp in shady areas, causing slippery algae growth. Newer plastic decking is worth investigating.

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