Climate Resilience in Your Own Backyard

Why does a climate resilient backyard matter?

- **Mitigating climate change impacts:**
By choosing plants that can tolerate extreme weather events, you can reduce the need for additional resources like irrigation during droughts or pest control when facing new pest pressures.

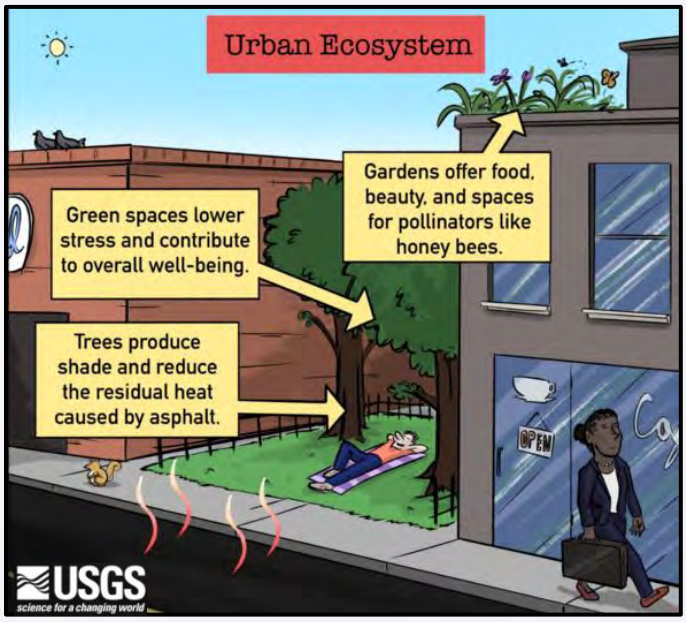
- **Supporting biodiversity:**
Native plants provide important food sources and habitats for local wildlife, which helps maintain a healthy ecosystem in your backyard.

- **Improving soil health:**
Practices like composting and cover cropping enhance soil quality, allowing plants to better withstand stress from changing climate conditions.

- **Reducing water usage**
Selecting drought-tolerant plants and implementing efficient watering practices can significantly decrease water consumption.

- **Carbon sequestration:**
Healthy plant growth helps absorb carbon dioxide from the atmosphere, contributing to carbon mitigation.

- **Food security:**
A climate-resilient garden can continue to produce food even when faced with unpredictable weather patterns, ensuring a more reliable food source.



Tree Canopy & Shade

Trees have so much to offer. They benefit the environment, wildlife, our communities, and our yards. Trees take in carbon dioxide, helping clean the air, while producing oxygen. They hold soil in place to help prevent erosion and when near waterways they help shade streams and rivers, moderating water temperature.

In your yard, well-placed trees can offer a home summertime shade and winter wind protection that can help reduce energy bills. Certain trees, such as willows and birches, planted in wet areas can help moderate flooding. Trees also support a range of wildlife, from birds to insects and mammals, by providing shelter and food sources. (*National Arbor Day Foundation, https://www.arborday.org/value*)

Carbon Footprint & Environmental Impact

For Americans, attaining that finely manicured lawn comes with a significant environmental cost. The traditional fescue grass lawn, so synonymous with suburban living, often results in increased greenhouse gas emissions, damage to local waterways, and a loss of biodiversity.

Gasoline-powered lawn and garden equipment (GLGE) used to maintain those lawns release carbon dioxide (CO^2) and are a prevalent source of carcinogenic emissions of benzene, butadiene, formaldehyde, carbon monoxide, and fine particulate matters. GLGE accounted for roughly 20 million tons of CO^2 emissions in 2011. (*U.S. EPA National Emissions from Lawn and Garden Equipment, https://www.epa.gov/sites/default/files/ 2015-09/documents/banks.pdf*)

The overuse of fertilizers, herbicides, and insecticides damages waterways and takes a toll on beneficial insect and wildlife populations. Homeowners use about 3 million tons of nitrogen-based fertilizers each year. This contributes to climate change due to the manufacturing process. Also, in most cases, lawns do not need, nor can they hold, the amount of nitrogen in the fertilizer. (*PSCI Princeton, https://psci.princeton.edu/tips/2020/ 5/11/law-maintenance-and-climate-change, 2020.*)

While grass lawns capture carbon dioxide, a major contributor to climate disruption, that benefit is more than offset by using gas-powered lawn equipment and other traditional practices. Many other plants also have more capacity for capturing carbon than lawn grasses, while offering support to pollinators and other wildlife. Incorporating a mixture of plants in your yard, emphasizing those native to the Mid-Atlantic region, can help create a habitat that supports essential pollinators, such as bees, butterflies, moths, and birds.

From changing your mowing habits and your type of lawn care equipment to swapping out portions of your traditional lawn for alternative plants, there are numerous practices you can incorporate into your seasonal yard care to make your backyard more resilient to climate change and more environmentally friendly.

Water Conservation

Climate change can exacerbate water scarcity and alter precipitation patterns, leading to increased variability in water availability. Conserving water helps communities adapt to changing climate conditions by ensuring a sustainable supply of water for current and future needs.

Homeowners can conserve water in their yard and landscape by following several good practices.

- Adopt water saving practices, such as watering the yard during the early morning or late evening, to minimize evaporation loss. Adjust sprinklers to avoid watering sidewalks, driveways, or other non-landscaped areas. Use drought-resistant and native plants that require less water once established.
- Apply mulch around plants and in garden beds to help retain soil moisture, reduce evaporation, and suppress weed growth.
- Use drip irrigation to minimize water loss through evaporation and runoff.
- Harvest rainwater by installing rain barrels or cisterns to collect rainwater from rooftops for later use in watering plants and gardens.
- Group plants with similar water needs together to create efficient irrigation zones.
- Set lawnmower blades higher to shade the soil and reduce evaporation. Leave grass clippings on the lawn to help retain moisture and provide nutrients.
- Incorporate water-saving landscaping features such as permeable paving, gravel pathways, and rock gardens to reduce the amount of irrigated turf area.
- Monitor for leaks in irrigation systems and repair them promptly to prevent water waste.
- Remove weeds that compete with plants for water and nutrients.

The EAC's publication, *Water Conservation for Carroll County Residents*, offers more information about water conservation in general and local requirements related to water conservation.

Lawn Maintenance (& Grass Alternatives)

Limiting or avoiding the use of chemicals for weed and insect control, and for fertilizing lawns, can go a long way toward protecting the health of the environment as well as your family.

The overuse and improper use of lawn chemicals can pose a health risk to humans, pets, wildlife, and aquatic life. Insecticides, such as neonicotinoids and pyrethroids, can disrupt the lifecycle of bees and other beneficial insects, while herbicides, such as triazinones and acetolactate synthase, can destroy the plants that pollinators rely on for food and as hosts for egg laying. (*National Wildlife Federation.* https://blog.nwf.org/2024/08/dangers-of-lawn-chemicals-impacts-and-alternatives/) During application, chemicals can drift and settle on ponds, outdoor furniture, and pools, as well as be tracked indoors on shoes. These chemicals can be absorbed through the skin, inhaled, or swallowed.

The use of certain groundcovers and other plants can help control weeds by shading or choking out weeds and invasives, thereby reducing the need for chemical treatment. Creeping thyme, bugleweed, ice plant "firespinner," creeping mazus, and other low-growing, spreading plants will also add color and diversity that benefit pollinators. (*Epic Gardening, "15 Spreading Groundcovers that Suppress Weeds"* https://www.epicgardening.com/weed-suppressing-ground-covers/)

Shifting to a more adaptable lawn grass, suitable for your yard, can also prove beneficial.

Turf-type tall fescue adapts well to various soil and light conditions and thrives in both full sun and moderately shady areas. It has a deep root system, which enhances drought resistance and allows it to stay greener for longer periods of time. It also has a lower susceptibility to diseases and insects than other turf grasses. (*UMD Extension,* https://extension.umd.edu/ resource/grass-seed/)

Micro-clover is another example of an adaptable alternative to a traditional lawn. It also provides pollinator habitat.

Fine fescues – including hard fescue, creeping red fescue, chewings fescue, and sheep fescue – are another excellent option for low-maintenance and drought-tolerant lawns, especially in shaded areas. These types of grasses require minimal fertilization – typically just one application in the fall – and should not be mowed during periods of heat stress and drought. Their low nutrient requirements and adaptability to challenging sites make them ideal for areas where traditional lawn maintenance is difficult. (*UMD Extension.* https://extension.umd.edu/resource/starting-new-lawn/)

Using naturally produced mulch around trees, shrubs, and in garden beds is another way to make your backyard more environmentally friendly. Mulch helps control weeds (reducing the need for chemical application), conserves soil moisture, and limits soil erosion during heavy rains. Pine bark mulch, shredded hardwood, pine needle straw, and other forms of natural mulch material, applied in a layer of 1 to 3 inches, helps the plants' root system, protects plants from equipment damage, and produces nutrients as the material decays. (*UMD Extension – Mulching Trees and Shrubs.* https://extension.umd.edu/resource/mulching-trees-and-shrubs)

Electric- or battery-charged lawn mowers and lawn equipment, such as blowers and weed whackers, offer an alternative to pollution-heavy, gasoline-powered equipment. The 2023 report, *Lawn Care Goes Electric*, notes that gas-powered lawn equipment generates fine particulate matter and volatile organic compounds, which are linked to respiratory ailments, as well as greenhouse gases such as carbon dioxide. It states that 722,471 tons of carbon dioxide and 597 tons of fine particulates were released in Maryland alone in 2020. (*U.S. PIRG Education Fun, Environment America Research & Policy Center and Frontier Group.* https://pirg.org/edfund/resources/lawn-care-goes-electric/)

Providing habitat for wildlife can include more than swapping lawn for perennials, shrubs, and trees. Leaving dead trees standing and fallen branches and trees on the ground will benefit many insects and other organisms by offering food and shelter. Woodpeckers, cavity-nesting birds, and some species of bees can use rotting materials. Using native plants, leaf litter, and logs around the dripline of trees also creates a habitat for pupating insects, particularly caterpillars. (*Homegrown National Park, "Make a Home for Wildlife,"* https://homegrownnationalpark.org/make-a-home-for-wildlife/)

Climate-Resilient Plants & Gardens

Climate change continues to impact weather patterns globally and regionally. Changes in precipitation patterns, such as extended droughts, more intensive precipitation events, and flooding, as well as warmer temperatures, are becoming more common and severe in the Mid-Atlantic region. Incorporating climate-resilient/drought-tolerant plants into your yard not only guards against losing parts of your landscaping, but it can reduce the need for overall watering and mitigate some of the impacts of climate change on your yard and neighborhood.

Heat stress from higher temperatures can cause higher water demand which is further worsened by periods of drought. New pest and disease pressures are also resulting from changes in the environment. Additionally, longer growing seasons can interrupt the natural life cycles of important non-plant species, especially pollinators.

Native plants often require less water, fertilizer, and pesticides and provide essential food and shelter for native wildlife. Perennial native plants help store carbon and reduce soil erosion. More plant diversity also supports pollinators and beneficial insects that play an important role in the health of your garden. Plants that can adapt to dry and warm conditions and well-drained areas include grasses and sedges, ground covers, perennials, shrubs, and trees.

Native species that can handle the dry times include:

Trees and Shrubs
- Fragrant sumac
- Eastern ninebark
- Downy serviceberry (*Amelanchier spp.*)
- White oak (*Quercus alba*)

Flowers
- Coreopsis *(Coreopsis lanceolata)*
- Black-eyed Susans (*Rudbeckia hirta*)
- Butterfly weed (*Asclepias tuberosa*)
- Wild Bergamot *(Monarda fistulosa)*
- Joe Pye Weed *(Eutrochium spp.)*

Grasses and Sedges
- Pink muhly (*Muhlenbergia capillaris*)
- Little bluestem grasses (*Schizachyrium scoparium)*
- Blue sedge (*Carex glaucodea*)
- Switchgrass *(Panicum virgatum)*

Groundcovers
- Green-and-Gold or Golden Star (*Chrysogonum virginianum*)
- Creeping Phlox (*Phlox stolonifera*)

Blue Stem Grass
https://hort.extension.wisc.edu/

Butterfly Weed
https://www.nutsfornatives.com/

Joe Pye Weed
https://pixabay.com/

Creeping Phlox
https://pixabay.com/

Black-Eyed Susans
https://pixabay.com/

Eastern Ninebark
https://www.carolinanature.com

Rain gardens are a very effective type of climate-resilient garden, which are designed to capture and mitigate the effects of stormwater runoff, as well as lessen the impacts of more intense rainfall events and flooding that are associated with climate change. For more information on rain gardens, see the EAC's "Rain Gardens" publication.

For a more extensive list, check out the Master Gardeners of Northern Virginia website at https://mgnv.org/plants/best-bets/dry-conditions/ and https://mgnv.org/wp-content/uploads/2020/01/Best-Bets-for-Dry-Conditions-V2.pdf.

Tip: Use native plants.

Planting Your Climate-Resilient Garden

Plant selection:
Choose native plants, when possible, that are well-suited to your local climate and can withstand drought and anticipated precipitation changes, such as more intense rain events.

Diverse plant communities:
Incorporate a variety of plant species with different growth habits and maturity times to create a more resilient ecosystem. Incorporate plant species that attract a variety of pollinator species, such as honey and bumblebees, butterflies, and hummingbirds.

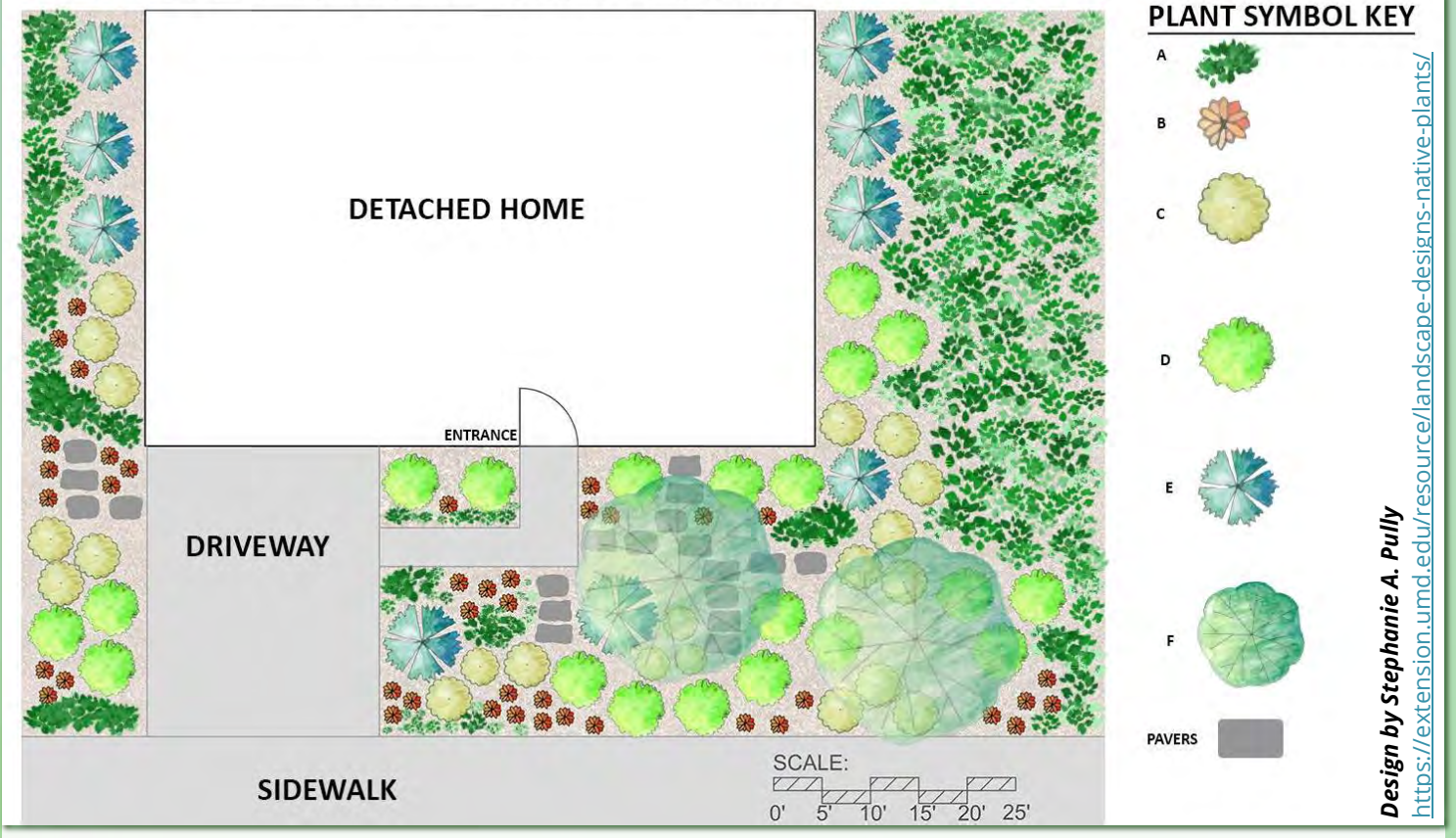
Water management:
Implement rainwater harvesting systems, use drip irrigation, and mulch the garden to conserve moisture.

Soil health practices:
Regularly add compost and organic matter to improve soil quality and water retention.

Consider microclimates:
Analyze your yard to identify areas with varying sunlight exposure and moisture levels to plant accordingly.

The University of Maryland's Extension Service (UMD Extension) offers a variety of resources for assisting with selecting plants and installing a climate-resilient garden. Check out their website for more information, such as the garden plan below.
https://extension.umd.edu/resources/yard-garden/climate-resilient-gardening/climate-change-gardening/

PLANTING PLAN FOR LAWN REDUCTION IN DETACHED HOME



Plant category key
A = groundcover, maturing about 1' tall or shorter, spreading. Spacing depends on selection.
B = perennial
C = small shrub, maturing at 2-4' tall and wide. Space about 3' apart.
D = medium shrub, maturing at 4-6' tall and wide. Space about 4' apart.
E = large shrub, maturing at 6-10' tall and wide. Space about 5' apart.
F = small tree, maturing at 15-30' tall and wide. Space about 20' from each other, a building, sidewalk, or other structure.

Pollinator Gardens & Wildlife Support

Pollinators are essential to our environment. The ecological service they provide is necessary for the reproduction of over 85% of the world's flowering plants, including more than two-thirds of the world's crop species. Pollinator populations are changing, and pollination is at risk. Habitat loss, pollution, pesticide use, introduced diseases, and changes in climatic patterns all contribute to the shrinking and shifting pollinator populations. (*Xerces Society, https://xerces.org/pollinator-conservation; Pollinator Partnership, https://www.pollinator.org/pollinators*) Without pollinators, many foods, beverages, fibers, spices, and medicines we use daily wouldn't be possible.

Just like everything else, pollinators need food, water and shelter to survive. While different pollinators have specific needs to support their lifecycle, all need high-quality habitat with an abundance of flowers, shelter and nesting sites, and protection from pesticides.

- **Food** in the form of abundant flowering plants that provide access to pollen and nectar throughout the growing season.
- Access to **shelter and nesting sites** including host plants for butterflies, pithy-stems and dead wood for cavity-nesting bees, and bare earth for ground-nesting bees.
- **Protection from pesticides** which kill non-target insects and degrade habitat by removing or contaminating flowering plants.
- **Advocates** willing to make changes in their own landscape, teach others, and spread the word to encourage pollinator-friendly practices in their community.

An ongoing way to enjoy pollinators and to reduce your impact on them is to plant a pollinator-friendly garden. You don't need a large yard or budget. Even a few plants will help. Here are some tips when planting a pollinator garden:

- Choose plants appropriate to Maryland's Piedmont region. Avoid invasive species. See the EAC's *Invasive Plants & Noxious Weeds* guide for more information.
- Focus your plant choice on native species. Avoid hybrid species; they often lack the nectar, pollen, and fragrance of a natural flower.
- Construct pollinator gardens with a variety of colors, shapes, and heights of plants and include plants that flower throughout the growing season, from early spring into late fall, to provide nectar and pollen. Clumps of plants will be easier for pollinators to find than single plants.
- Add a water source in or near the pollinator garden. Consider a dish or birdbath, or even a small pond, and change the water every other day to prevent mosquitoes from breeding.
- Add plants that caterpillars need as well if you want to see butterflies. Since providing a home for caterpillars means having plants that will be eaten, and some host plants are less aesthetically pleasing, place caterpillar host plants where they aren't too visually prominent. These plants provide essential habitat and allow you to watch the butterfly lifecycle in your yard. (*U.S Fish & Wildlife Service, https://www.fws.gov/story/highlighting-importance-pollinators*)
- Do not use pesticides in your yard or garden. Learn to tolerate some damage and control pests in natural ways.
- Provide nesting spaces to support pollinators that may be migrating into new areas due to climate change.

(*Xerces Society: https://xerces.org/pollinator-conservation/yards-and-gardens; Mid-Atlantic plants for pollinators and beneficial insects, https://xerces.org/publications/plant-lists/native-plants-for-pollinators-and-beneficial-insects-mid-atlantic*); (*UMD Extension: https://extension.umd.edu/resource/pollinator-gardens/*)

Take it a step further . . .

Edible Landscaping

Why Plant Edible Landscaping?

Including edible plants as part of your yard's makeover can significantly reduce your overall climate impact. In fact, pursuing edible landscaping or traditional vegetable gardening as a lawn alternative offers a win-win for residents. Homeowners can control the quality and safety of the food they put on their tables, as well as lower grocery bills by producing edible nuts, berries, herbs, and vegetables in their own yards. Eliminating the need to store, transport, and package these items when otherwise bought at the store also reduces your carbon footprint. Reduction of food waste is another benefit. (See the EAC's Reduce Food Waste at Home.)

Edible gardens that focus on plants that provide nutritional or medicinal value can include easily grown, and even attractive, vegetables, herbs, and fruits.

Integrating Edible Plants in your Landscape

Edible plants can be integrated in a variety of ways. The most common would probably be planting of a traditional vegetable garden. However, edible plants can be incorporated in other ways as well. Examples include planting fruit trees and bushes, as well as mixing edible plants in with the ornamentals / perennials and other plants in your climate-resilient garden.

The University of Maryland Extension (UMD Extension) provides insightful tips on starting a vegetable garden at https://extension.umd.edu/resource/how-start-vegetable-garden/.

Growing Fruits

While it is tempting to jump in with plans for a variety of fruit trees and hopes for a quick, bountiful harvest of home-grown apples, peaches and pears, homeowners should consider the space, expense, and labor investment needed to produce the larger fruits. Tree fruits typically require more work and patience, and have more pest problems that require regular, yearly preventative pesticide sprays, especially early in the season. There are numerous dwarf species of fruit trees available that do well in our region, many of them Asian varieties. Among native fruits, some are lower maintenance than others.

Producing fruit requires a notable amount of energy for young fruit trees. Depending on the plant, it is recommended not to allow fruit trees to bear fruit for the first couple years. By removing the flowers and fruit, it will strengthen a young tree's root system and its branching for better long-term health.

The UMD Extension recommends starting with small fruit shrubs, such as blackberry, raspberry, blueberry, serviceberry, or elderberry. or herbaceous plants such as strawberry. Small fruits can usually be grown without pesticides, but they can be vulnerable to insect pests and diseases.

To help with your research on the best fruits to grow on your property, the Maryland Extension offers an extensive guideline for selecting and comparing fruits, prepping sites, plant care and more at "Starting a Home Fruit Garden." (*UMD Extension, https://extension.umd.edu/resource/starting-home-fruit-garden*)

Edible Plants in Your Ornamental Garden

Another interesting way to incorporate edible plants to your landscaping is by mixing edible plants in with the ornamentals / perennials and other plants in your climate-resilient garden. Herbs tend to be easy to start with, but there are a variety of vegetables that also blend well. Look for herbs and vegetables that do well in the Maryland climate. You may even want to try edible flowers. Below are just a few examples.

Herbs to Try:

- Chives
- Thyme
- Lavender
- Rosemary

In addition to being pretty to look at, lavender and rosemary also smell good when you brush against them. Note that, while mint looks and smells pretty, it spreads quickly.

Continued on Pg 8

Edible Landscaping

Continued from Pg 7

Vegetables to Try:
- Kale
- Romaine lettuce
- Asparagus
- Garlic

Edible Flowers to Try:
- Nasturtium
- Sunflowers
- Pansies

North Carolina State University offers excellent tips for incorporating edibles in the landscape at https://content.ces.ncsu.edu/growing-edibles-in-the-landscape.

Tips for planting an edible garden include:

- Start small, with reliable and easy plants, and expand from there.
- Install a trellis or arbor to grow climbing vegetables, such as beans, cucumbers, winter squash, or grape vines, vertically to save space and add a vertical element.
- Plant herbs like lavender, chives, and thyme as borders along flower beds or walkways or use to fill gaps in flower beds.
- Blend edible with the ornamental by mixing in plants such as purple kale, rainbow chard, or artichokes for a delicious display. (*Better Homes and Gardens, https://www.bhg.com/edible-landscaping-ideas-8675467*)

Plants to Keep Pests Away

To ensure you get to enjoy your plants more than the unwanted insects and wildlife do, consider plants suitable for Maryland that are both climate-resilient and that repel pests. Some examples include:

- Butterfly milkweed (*Asclepias tuberosa*): Known for its pest-resistant sap.
- Bee Balm (Wild Bergamot, *Monarda fistulosa*): Aromatic foliage repels deer and rabbits, and flowers deter general garden pests.
- Purple Coneflower (*Echinacea purpurea*): Its structure makes it unattractive to browsing animals, and it is resilient.
- American Holly: Deer resistant.
- Pawpaw: Deer resistant.
- Mountain Mint: Repels mosquitoes and attracts beneficial pollinators.
- Marigolds: Repel aphids, mosquitoes, and nematodes.
- Alliums (including leeks, chives, shallots): Can help repel various pests like aphids and slugs.
- Mint: Deters ants, flies, and rodents. Note: Mint spreads aggressively and may need containment.
- Rosemary: Repels mosquitoes, flies, and moths.
- Basil: Deters flies and mosquitoes.
- Lavender: Repels mosquitoes, flies, and moths.
- Chrysanthemums: Contain natural pest-repelling compounds.
- Lemongrass: Repels mosquitoes and gnats.
- Catnip: Repels mosquitoes.
- Citronella Grass: Its scent repels mosquitoes.

Johnson's Landscaping webpage, "Using Plants to Repel Pests: A Natural Guide for Pest Control," offers more information on the benefits of pest-repelling plants and tips for using them.

Check out Maryland Department of Agriculture's guide, *Try Pesticide Alternatives*, for additional information on beneficial and harmful bugs and plants to help control them.

Prepared by Carroll County Environmental Advisory Council (EAC)
CarrollCountyMD.gov/EAC
EAC@CArrollCountyMD.gov
410-386-2949

Scan Here for this & other EAC publications