

Indoor Greening

Overview: Create a green haven indoors by decorating your classroom and home environment with plants.

Grade Level/Range: Adaptable for all ages

Objective: Students will explore the benefits of indoor plants by designing (and creating, if resources allow) an indoor garden to enjoy during winter months.

Time: 1-2 hours to design, 1-2 hours to build

Materials:

- Indoor gardening books or Internet access
- Paper and pencils
- An old cart, wagon or wheelbarrow (optional)
- Soil, pots and indoor plants (optional)

Background Information

As cold weather takes hold across the country, the predominant green of the landscape is replaced by browns, grays and whites. An important part of nature's cycle, winter is a time for plants in most parts of the country to rest up for the spring show. Even though we know change is right around the corner, sometimes the short days and gray skies can be a real downer. Many gardeners combat this time by pouring over seed catalogs and dreaming of next year's garden. An alternative is to create a green haven indoors by decorating your classroom and home environment with plants.

Historical Perspective of Greening the Indoors

Imagine the winter season without the modern-day conveniences of electricity and indoor plumbing. People relied on candles and fireplaces for light during gray, short days. Since water was pumped from wells and had to be boiled to be heated, baths were few and far between. Deodorants and perfumes were limited. Ask students to imagine what life would have been like when cold weather hit and folks became stuck inside small houses and buildings for long periods of time? How do you think they reminded themselves of the beauty of spring and summer to bring joy to the winter days?

People turned to evergreen plants for relief. Ancient Greeks and Romans would decorate their houses with boughs and wreaths of evergreens like holly as a way to symbolize nature and the promise of spring to come. The practice became part of a winter festival called Saturnalia honoring Saturn, the god of agriculture. The tradition continued through the years, although over time it became associated with the Christmas holiday. Starting in Germany during the 1500's, whole evergreen trees would be placed indoors as symbols of protection and immortality.

Regardless of the symbolism attached to their placement, there was a more practical side to greening. The evergreen swags brought life into dull winter households. Decorative items like paintings and mirrors were rare and expensive, but greens were provided by nature for free for everyone's delight. The greens also added a fresh fragrance to stuffy air. A precursor to scented candles and air fresheners, greens such as rosemary would be placed on the floor so that the room would fill with a pleasant aroma with every step.

Although modern conveniences have certainly lessened the unpleasantness associated with winter months, we can continue the tradition of greening our indoor environments today to enhance our quality of life.

Decorating with Plants

Decorating with plants is a great way to continue the gardening experience in your classroom or at home through winter months. There are two main categories of greens, cut and potted plants.

Cut plants are those that have been detached from their roots such as evergreen branches. Some deciduous branches like forsythia and pussy willows are also fun to bring in, as the move to the indoor climate will force spring buds to open early. Although cut plant parts can be placed in water to extend their freshness, as soon as they are brought indoors the clock begins ticking down on their usefulness. As they dry, they will begin to lose their leaves and needles, along with their pleasant aroma.

Potted plants, however, still have their living roots intact in mini soil environments enclosed by a container. They continue to draw up nutrients and water and thus will provide green benefits longer. A challenge with potted plants is finding varieties that will thrive with the indoor conditions of lower light. During much of history, potted plants were reserved for the very rich who could afford to build glass houses or conservatories to grow plants indoors. However, the discovery and propagation of tropical plants growing in low light rainforest conditions, the invention of electricity and thus increased artificial light available in indoor environments and the addition of more windows to building structures have made potted plants an affordable option for all.

Benefits of Bringing Plants Indoors

There are many benefits to adding plants to your indoor environments including:

Brighten the décor and create a nurturing environment.

Whether we recognize it or not, humans respond positively to green. Being surrounded by the green of nature helps to relax us, inspires peaceful thoughts and decreases feelings of stress. Studies have also shown that plants can help in the healing process, with faster recovery rates for patients who have natural views. Check out these research findings: People are more relaxed when viewing green landscapes vs. an urban scene. (Ulrich, R.S., and R.F. Simons. 1986. Recovery from stress during exposure to everyday outdoor environments. p. 115-122. In: J. Wineman, R. Barnes, and C. Zimring (eds.). The Costs of Not Knowing. Proceedings of 17th Annual Conference of the Environmental Research and Design Association, Washington, D.C.).

The presence of plants in a room increases attention and reduces stress. (Lohr, V.I., C.H. Peason-Mims, and G.K. Goodwin. 1996. Interior plants may improve worker productivity and reduce stress in a windowless environment. Journal of Environmental Horticulture. 14:97-100.).

Students perform better when the view from their room is dominated by plants vs. buildings and pavement. (Tennessen, C.M., and B. Cimprich. 1995. Views to nature: Effects on attention. Journal of Environmental Psychology. 15:77-85.).

Patients in hospitals recover more quickly and experience less pain if their rooms look out onto trees rather than on a building. (Ulrich, R.S. 1984. View through a window may influence recovery from surgery. Science 224:420-421.).

Clean the air.

Plants clean the air around you. It's not just that plants absorb the carbon dioxide we exhale and give us fresh air to breathe in return; they're also extremely effective at removing environmental toxins, like formaldehyde and benzene, from the atmosphere. The ability of houseplants to clean the air has been recognized for decades. How do they do it? As part of their normal life processes, plants draw air in through their leaves. The plants themselves break down some pollutants during their normal physiological processes, but soil-dwelling microbes around plant roots do much of the work, too.

It's not just what they absorb that make plants great companions, it's also what they give off. Plants transpire water vapor, making them natural room humidifiers, and even though they grow in soil, they can reduce the amount of interior dust by up to 20 percent, according to research from Virginia Tech. Dr. B.C. Wolverton discovered that they emit substances that suppress airborne bacteria and mold spores, reducing these hazards by 50 to 60 percent.

In the 1970's and '80s, NASA research aimed at designing a livable moon base using plants to clean the air yielded results that are applicable right here at home. Some of the best living air purifiers are areca palm (*Chrysalidocarpus lutescens*), English ivy (*Hedera helix*), rubber plant (*Ficus robusta*), Boston fern (*Nephrolepis exaltata*), schefflera (*Brassaia actinophylla*) and bamboo palm (*Chamaedorea sefritzii*).

Basic Indoor Plant Care

The benefits of plants in the indoor environment are significant, but it is important to recognize that unlike other decorative materials, they are not maintenance free.

To care for cut plants:

Many cut plants can be placed in water to extend their life. Stems should be re-cut immediately before placing in the water because sap may gather at the base and block new water uptake. Additionally, the water should be refreshed periodically to avoid bacteria build up which can generate unpleasant odors. Their life can be extended by keeping them out of direct sunlight and away from heaters and/or drafts which may speed up the dehydration process.

To care for potted plants:

Potted plants will require the following care:

Watering - Since (hopefully) rain is not falling inside your home or classroom, you will need to provide water for your potted plant. Try to avoid both over-watering, which can lead to root rot, mold and fungus gnats, and under-watering, which can lead to stunted plant growth and leaf drop. As a general rule, let your plant dry out to the point that the top inch or two (depending on the size of your container) of soil feels dry to the touch, then water your plant until it begins to drain from the bottom of the pot. Remove any excess water from the plant tray so that the pot does not sit in water. How often will you need to water? Water needs will vary greatly with indoor conditions including temperature, light and humidity, so it's best to check your plant frequently and water as needed rather than trying to stick to a specific watering schedule.

Fertilizing- Using potting soil with added fertilizer will provide the nutrients your plants will need for healthy growth for a few months. However, with time or if your potting soil does not contain any fertilizer, you will need to supply nutrients through either an organic or chemical fertilizer. Worm castings and tea from an indoor compost bin are a great source

of nutrients for classroom plants. Most indoor plants have very low nutrient needs and will provide you with signs such as yellowing leaves or slow growth if fertilizer is needed.

Lighting - Sunlight from windows provides an adequate source of light for many indoor plants. However, if you begin to notice tall, lanky growth or yellowing of leaves, your plants may not be receiving enough light for proper growth. You can supplement with artificial lighting in a setting like a GrowLab.

Repotting - Making sure you have the right size pot is critical for maintaining proper moisture levels. Too small of a pot can lead to root circling and the need for frequent watering; however containers that are too large makes it very easy to over water. A good general rule is to go up only one or two pot sizes when repotting.

Click here <https://kidsgardening.org/gardening-basics-indoor-gardening/> for more information about indoor gardening.

Laying the Groundwork:

Ask students to describe how the outdoor winter landscape looks different than it does the rest of the year? How does this make them feel? Do they miss the green of their garden and landscape plants?

Come up with a list of places where they have seen indoor plants. How do those spaces make them feel? Share the information about the benefits of indoor plants from the Background Information.

Exploration:

1. Tell students you are going to challenge them to design an indoor garden. Explain that indoor plants have the same needs as outdoor plants, including light, water, nutrients, air and space to grow. Fortunately for us, there are some plants that thrive in lower light conditions that can be delivered through sunny windows and indoor grow lights. The garden they design must be able to provide for all of their plants' needs.
2. Have students research different indoor growing systems, including windowsill gardens, light gardens and conservatories. Next explore your school building to see if you can find a good spot to plan your own indoor garden. Share the You Tube Video (<https://www.youtube.com/watch?v=PowDBZxnO6o>) about creating a mobile Indoor Fresh Air Garden from one of the 2017 Carton 2 Garden winners Jefferson Elementary School.
3. Have students work in pairs or teams to design an indoor garden for your school. It can be a mobile or stationary garden, depending on your site availability. Some ideas for a stationary garden might include a shelving unit or even a hanging garden (see this idea from another Carton 2 Garden winner <https://www.youtube.com/watch?v=7oArgqKdvx8> on how to build a hanging garden from old lunch trays). A mobile garden could be made from an old cart, wheelbarrow or wagon.
4. After they plan the garden structure, have students research different plants that they think would grow well in their garden. Here is a list of a few possibilities to help them get started:

Plants to Try

The variety of indoor potted plants readily available at garden centers grows each year. In a classroom setting you want to stick to plants that are easy to care for and

thus offer a high rate of success. Additionally, you may want to look for plants that propagate well to use for science experiments and for growing new plants for your young gardeners to take home. Depending on the age of your students, you may also want to avoid plants with poisonous parts. A comprehensive list of poisonous plants is available from NC State at:

<http://www.ces.ncsu.edu/depts/hort/consumer/poison/poison.htm>. On our list you will find an asterisk beside any plant listed in this database, even though most are only dangerous if consumed in large quantities or because they cause skin irritation in some people. Please visit the site for more details. Here are a few ideas for plants to try:

Foliage Plants

Coleus* - A popular outdoor bedding plant, many varieties of coleus are adapted to shade and therefore can also adapt to indoor environments for the winter. They come in a wide variety of colors, sizes and shapes and can add a real punch of color to any room. Shorter varieties adapted to lower light levels do best indoors. Coleus plants are very easy to propagate from cuttings and can be started in both water and soil, making them an excellent stock plant for science experiments.

English Ivy* - An easy-to-grow evergreen vine with low light requirements, English ivy adapts well to indoor growing environments. It can be used to make topiaries that add a bit of whimsy to your indoor garden. You can purchase wire frames over which to train vines or you can make your own from coat hangers.

Ficus* - Also known as weeping figs or rubber trees, depending on the species, ficus trees are commonly grown indoor plants. They can be grown in a shrub-like, multi-trunk shape, or pruned to take on a traditional tree form. Their shape and size provides taller greening in a classroom. Another cool thing about ficus trees is that they can be propagated using air layering, where roots are developed without detaching cuttings from the mother plant. Air layering can be a challenging and intriguing experiment for older, more advanced students.

Ferns - There are a number of different types of ferns available for indoor gardens. Probably one of the most common is the Boston fern. Ferns grow well in hanging baskets and can work well in a classroom with limited shelf space. They prefer environments with higher humidity. Ferns have a very unique reproductive cycle producing spores rather than seeds providing an opportunity to learn about the diversity of the plant kingdom in a hands-on way.

Jade plant - With thick, fleshy leaves that can store water when available, jade plants are very tolerant of infrequent watering and need little care. They also are excellent for propagation experiments and can be grown from both stem and leaf cuttings.

Polka-Dot Plant - This plant is as cute as its name, with bright splashes of speckled pink and green leaves. Although it can grow to a medium sized plant of 2 to 3 feet, it tends to stay much smaller indoors and does well in terrariums.

Pothos* - One of the easiest and least demanding indoor plants, pothos vines are vigorous growers. They can be grown in a regular pot and pruned to maintain a mounding appearance. Another option is to plant them in hanging baskets to allow the vines to cascade down. Alternatively, roots will form along the vines, allowing them to be grown up commercial or homemade moss poles or up a trellis to take advantage of vertical space. Their heart-shaped leaves may be solid green or

variegated in green and white or green and yellow patterns. Pothos is very easy to propagate from stem cuttings.

Spider Plant - Widely available in variegated varieties with green and white leaves, spider plants can really brighten up a dull room. They can be grown in hanging baskets to save shelf space or grown in traditional pots. They produce lots of new plantlets on runners that can be used to start new plants. In humid environments, the plantlets will even form new roots while still attached to the stock plant. Spider plants are great to have on hand if propagating plants for plant sales or special projects.

Strawberry Begonia - A small, mounding plant that can be grown in a regular pot or a hanging basket, strawberry begonias also produce small plantlets on runners, which can then be separated from the mother plant to start new plants. Watching these “babies” grow is fun for kids and a great way to produce large quantities of new plants so each child can take one home.

Blooming Plants

African Violets - With sufficient light and regular fertilization, African violets provide attractive flowers when grown in indoor environments. The blooms are available in a rainbow of colors, but are most frequently found in shades of white, pink and purple. They can be propagated by both leaf and stem cuttings, and also when healthy, they will start to multiply in their pot and can then be propagated by division.

Begonias ** - A wide variety of begonias are available, representing a diversity of leaf and flower colors. An interesting science topic to examine, begonias are monoecious, meaning they have separate male and female flowers located on the same plant. Their succulent leaves and stems make them great stock plants for stem propagation.

Phalaenopsis Orchids - Although often thought of as tricky to care for, phalaenopsis orchids actually require very little maintenance and do well in low light. Orchids are grown in a loose mix of bark and peat rather than traditional potting soil and prefer humid environments. They only bloom once a year, but the blooms can last for up to 3 months. From an education standpoint, the fused parts of the orchid flower can help you demonstrate the adaptations of flowers over time.

Herbs

Although many herbs prefer full sun, below is a list of herbs that you can try growing indoors under lower light levels. It is best to grow dwarf varieties and provide as much light as possible by placing in a south or west facing window or under grow lights.

Basil- Like other culinary herbs, basil is a stimulating sensory plant for children to smell and taste. Aside from traditional basil, there are also lemon, lime, anise, and cinnamon flavored types. Leaf color and shape also varies, from tiny, pale green leaves to deep purple ruffles.

Chives - Chives are normally grown for their flavorful leaves, which can bring a mild onion/garlic-like flavor to dishes like salads and baked potatoes.

Oregano- Oregano is a compact herb plant. The herb is a favorite in Greek, Italian, and Mexican cooking.

Parsley - Parsley is high in Vitamin A and by weight has more Vitamin C than an orange! The curly variety has a tight, mounding growth that resembles a bed of soft moss, making it a nice "touch plant."

Thyme - Thyme is a small growing, woody shrub with oval leaves. Creeping varieties are a good fit for indoor growing.

*This plant is found on the Poisonous Plant List from NC State at: <http://www.ces.ncsu.edu/depts/hort/consumer/poison/poison.htm>. Please visit the site for more details.

** Wax and tuberous begonias are found on the Poisonous Plant List from NC State.

5. Provide time for students to present their garden designs as a proposal to other classrooms, your principal and parents. Perhaps these supporters can help you find the funding to turn your garden into a reality.

6. If possible, plant and care for your garden. Enjoy!

Making Connections

The ability to grow plants indoors is key for the future of space travel. Learn more in the lesson Plants in Space <https://kidsgardening.org/lesson-plans-plants-in-space/> Create a survey and interview friends and family members to gather their thoughts and feelings related to indoor plants and greening. Compile and analyze your results.

Branching Out

History - Learn about the history of orangeries, dedicated spaces in the homes and palaces of the wealthy used to grow tropical fruits. Find pictures of modern day conservatories or if possible, visit one in your area.

Math – Develop a business plan to create an indoor gardening business. Business ideas might include growing and selling your own indoor plants or providing an indoor plant care service (many malls and office buildings hire people specifically to take care of their indoor plants, for example).

English – Create an indoor plant care brochure to share with friends, family and other community members.