Introduction to Indoor Gardening

NATIONAL PARKS
LET'S MAKE SINGAPORE OUR CITY IN NATURE

Community in Bloom

Community in Bloom **Indoor Gardening**

As Singapore transforms into a City in Nature, Community in Bloom (CIB) continues to reach out to all residents to promote a greater appreciation for greenery and to nurture a gardening culture.

With the rapid urbanisation of our nation, land has become a scarce resource. Many residents now live and work in high-rise buildings. Creating indoor gardens give us plenty of opportunities to enjoy greenery in our everyday lives and deepens our appreciation for nature.

Through CIB's Indoor Gardening Programme, you can now transform your home and office into indoor gardens.

What is **Indoor Gardening**

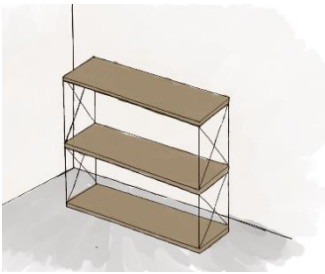
As more residents take up gardening as a hobby, new gardening enthusiasts may be unable to find space for gardening. This is where the CIB team can assist by providing advice on indoor gardening.

Studies have shown that plants have a positive effect on our mental, physical and emotional well-being. Some studies even suggest that greenery can aid us in memory retention! Hence having a garden in our homes, offices or schools can benefit us all.

An indoor garden can be as simple as having an arrangement of dish gardens or terrariums on your desk, or having a few potted plants around. You may also take it one step further by constructing an indoor landscape!

With a little creativity and passion, anyone can transform an indoor space into a green sanctuary.

Indoor Garden **Considerations**



Space

Identify a corner for you to set up your indoor garden. It should be large enough to house all your plants.

Light

Find a space where there is an east or west-facing window. In case of insufficient light, consider setting up artificial lighting such as a table lamp or grow lights.

Water

Water is essential for all plants, with some requiring more of it than others. Plan a schedule to help you remember when to water your plants.

Plant Choice

Do some research on plant choice before purchasing to avoid buying plants that are not suitable for your home, particularly if you have children or pets.

Indoor Garden **Considerations**

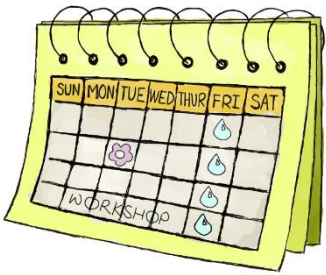
Air flow

Good air circulation is needed for plants such as *Tilandsia sp.* and succulents. Air-conditioning also lowers the humidity which causes some plants to lose water at a higher rate.

Cleanliness

Use soil-less media such as pumice or sphagnum moss instead of potting mix for easier cleaning in case of spillage. You could also look into keeping plants that do not require soil such as *Tillandsia sp.*

Group Activities



Besides maintaining your indoor garden regularly, why not plan activities with other gardeners?

These could include mass propagation of plants for giveaway or sharing ideas to redesign plant labels for the garden.

Plant Necessity - **Light**

Light is one of the main requirements for a plant to photosynthesize. The quality and quantity of light are attributing factors for the plant's health.

Access to a bright east or west-facing window with about 4 hours of sunlight should be sufficient for most indoor plants since most are shade-loving plants. However, without access to natural light, **artificial lighting** may be needed for the plant to thrive indoors.

What is photosynthesis?

Photosynthesis is the process where the plant utilises light to synthesize nutrients from carbon dioxide and water. Chlorophyll which is present in leaves absorbs most of the light from the **red** and **blue** light spectrum. Other wavelengths of light are absorbed by the plant but in small quantities.

Tip: The recommended distance between the light source and plants is about 20 cm to prevent leaf burn.

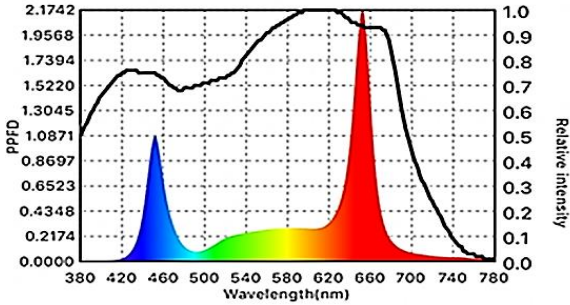
Using **Artificial Lighting**

Understanding the light required for your plants

Light intensity is measured in **lumens (lm)** for most household lights. Lumens is a basic unit of measurement for light brightness as perceived by the human eye.

However, what our eyes perceive as bright might not appear as bright to plants. A light fixture that has more blue and red light would have lower lumens than a green and yellow light which our eyes are more sensitive to.

The spectral range useful for plant growth is defined as **Photosynthetically Active Radiation (PAR)** which refers to wavelength from 400nm to 700nm. This is shown in the graph below.



To determine how much useful light is reaching your plants, you will need to understand the **Photosynthetic Photon Flux Density (PPFD)** value. Its unit is in μmol/m^2/s which measures the number of **photons** in the suitable spectra range received by the plant surface at a certain time.

The larger the value, the more usable light is reaching the plant surface. This value can be found in the specifications for various grow lights.

Using **Artificial Lighting**

Choosing your Lights

There are many types of lights to choose from for your indoor plants. From the usual LED table lamp to high-intensity discharge lamps (HID), it depends on the factors shown below.

LED Table Lamp

LED Grow Light

Metal Halide Bulb

Lights (Generalised comparisons)	LED household lights	LED Grow lights	HID lamps
Suitable spectrum (avg. PPFD)			
Heat emission			
Energy consumption			
Initial cost	$	$$$	$$

LED household lights or grow lights?

LED household lights contain red and blue wavelengths within the light spectrum which are necessary for photosynthesis albeit at lower intensity.

Grow lights are modified to produce more light in the red and blue spectra which allows for better plant growth. Hence they may be more expensive due to the customised design. If you wish to grow shade-loving plants in your indoor garden, regular LED bulbs would suffice as they are energy-efficient and generally inexpensive.

Plant Necessity - **Media**

A good medium for your plants encourages good growth and general health.

Potting mix with different combinations of loamy soil, compost and sand is good for most types of plants. In indoor gardening, **soilless media** can be used in place of garden soil.

Most soilless media are **sterile** making them apt for an indoor enviroment as they do not carry unwanted spores, weed seeds and soil bourne diseases. Depending on the soilless mixture, they may also be **lightweight** making them easier to handle within the indoor space.

These soilless media can be used in different combinations to suit different types of plants in your indoor garden.

Peat Moss

Decomposed plant material from *Sphagnum sp.* retains water well but does not last a long time due to its organic nature.

Lightweight Expanded Clay Aggregate (LECA)

Made by heating clay to high temperatures that creates large pores within the clay particles, they are shaped in rounded pellets which makes them easy to handle. They have good porosity but have little to no nutrients.

Plant Necessity – **Media**

Compost

The result of decomposed plant or animal material, it is rich in nutrients and good for its water-holding capacity.

Perlite

Made from heating silica at a high temperature, it is added into soil to improve drainage due to its high porosity. It lasts for a long time due to its inorganic nature. It crumbles when pressure is applied.

Note: Wear a mask when handling to prevent inhalation of finer particles.

Pumice

These are light-coloured volcanic rocks with many pores. Often used as a soil amerliorant to improve drainage, it is also lightweight, making it a popular choice for vertical greenery.

Washed Sand

A complex mixture of small inorganic mineral particles, it is used to improve soil texture and drainage. It is good for seed germination and rooting plants as it provides good aeration of plant roots.

Plant Necessity – **Media**

Sphagnum Moss

Made from dried *Sphagnum* sp., it is excellent at holding water. Commonly used in growing orchids and carnivorous plants like the Venus Fly Trap and Sundews, it will break down after some time due to its organic nature. Sphagnum moss harvesting is not a renewable resource.

Coco Peat

Made from cocohusk, its granular form is loose and light, improving drainage and texture of the soil mixture. It is generally inexpensive.

Vermiculite

Made from Mica which is light and does not crumble, it is added into soil to improve drainage and its nutrient-holding capacity. It also promotes consistent release of nutrients suitable for the uptake of plants.

Charcoal

Made from burning plant materials, large pieces are usually used for growing orchids while smaller pieces are mixed into soil to improve drainage.

Tools and **Materials**

Useful tools for your indoor garden!

Squeeze bottle

Types of **Indoor Gardens**

Indoor spaces can accommodate a variety of indoor gardens that may require different types of maintenance. For a start, it is better to set up one indoor garden type before moving on to more advanced ones.

Terrariums

Terrariums are miniature ecosystems encased in sealable containers, whereas an open terrarium may be an ideal home for plants that are less able to adapt to the humid environment in an enclosed terrarium. Terrariums are low-maintenance and can beautify your indoor space.

Dish Gardens

Dish gardens make use of dishes or shallow containers to form miniature landscape gardens. The type of maintenance for your dish gardens depends on the type of plants your have.

Types of **Indoor Gardens**

Air Plant Displays

Air plants are epiphytes that do not need soil or other media, and grow on trees in their natural habitat. Just by tying them on driftwood or placing them in a pretty container, they become charming displays. Air plants need to be placed near a bright window and require soaking every week for them to thrive.

Kokedama

Kokedama, a Japanese variant of bonsai, literally translates to "moss ball". It is done by molding the root ball into a circular shape with the plant in the middle.

Aquascape

Aquascaping is the art of creating an underwater landscape using plants, driftwood, rocks, and other materials commonly found in an aquatic environment.

Plant Choice


Prefers full shade (<4 hours of sunlight)


Prefers semi-shade (4-6 hours of sunlight)


Prefers full sun (>6 hours of sunlight)


Requires little water


Requires a moderate amount of water

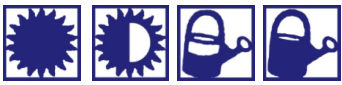

Requires a lot of water

Terrariums & Dish Gardens

These plants are suitable for terrarium and dish garden displays. Choosing plants with varying leaf sizes and patterns will make the display seem more intricate. Plants chosen for terrariums should be able to withstand the high humidity within the contained space.

Red Nerve Plant

Fittonia albivenis (verschaffeltii group)



Peperomia nitida 'Variegated'

Trailing Jade

Peperomia rotundifolia

Plant Choice

Baby Toes
Pilea depressa

Parallel Peperomia
Peperomia puteolata

Ficus pumila 'White Sunny'

Baby rubber plant
Peperomia obtusifolia

Aluminum Plant
Pilea libanensis

Mat spike-moss
Selaginella

Plant Choice

Air Plants

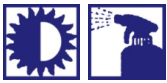
This is a special group of plants from the Bromeliaceae family. It is epiphytic in nature and most have trichomes (tiny hairs) on their leaves to absorb moisture and nutrients from the atmosphere.

Blushing Bride

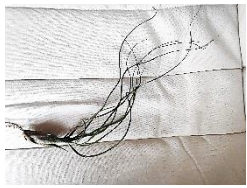
Tillandsia ionantha

Spanish Moss

Tillandisa usneoides



Tillandsia butzii



Tillandsia bulbosa

Tillandsia funckiana

Plant Choice

Succulents

A broad group of plants with the ability to store water in fleshy plant parts to combat water shortage and to reduce water loss. These succulents can be arranged together in a dish garden with suitable porous media.

Elephant's Food

Portulacaria afra (Variegated)

Burro's Tail

Sedum morganianum

Mother of Millions

Bryophyllum daigremontianum

Gasteria obliqua

Fairy Washboard

Haworthia limifolia

Plant Choice

Draping Plants

These are plants with trailing and/or creeping hanging habits. Great for aerial planters or Kokedamas as it allows the plant to extend downwards making your indoor garden aesthetically pleasing. These plants are relatively hardy.

Lipstick Plant

Aeschynanthus pulcher

Spider Plant

Chlorophytum comosum

'Vittatum'

Heart Leaf Philodendron

Philodendron hederaceum

Pseudorhipsalis ramulosa

Dischidia oiantha (Varigated)

Plant Choice

Ornamental Foliage

These are plants with colourful and patterned leaves. They could be planted in a terrarium or arranged into a large dish garden. Their attractive leaves and flowers brighten up your indoor garden.

African Violet

Saintpaulia ionantha

Begonia sp. 'Martin's Mystery'

Episcia cupreata

Devil's Ivy

Epipremnum aureum

Jewel Orchid

Ludisia discolor

Plant Choice

Window-Leaf Monstera
Monstera obliqua

Wandering Jew
Trandescantia zebrina

Chinese Money Plant
Pilea peperomioides

Peperomia 'Eden Rosso'

Miniature Arrowhead Plant
Syngonium 'Pixie'

Panda Plant
Kalanchoe tomentosa

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www.nparks.gov.sg/cib

E-mail us at communityinbloom@nparks.gov.sg

For more varieties of plants and their growth requirements, visit NParks Flora and Fauna web
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National Parks Board
Headquarters
Singapore Botanic Gardens
1 Cluny Road, Singapore 259569

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