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Gardening

Guide

for
Environmental & Sustainable
Education

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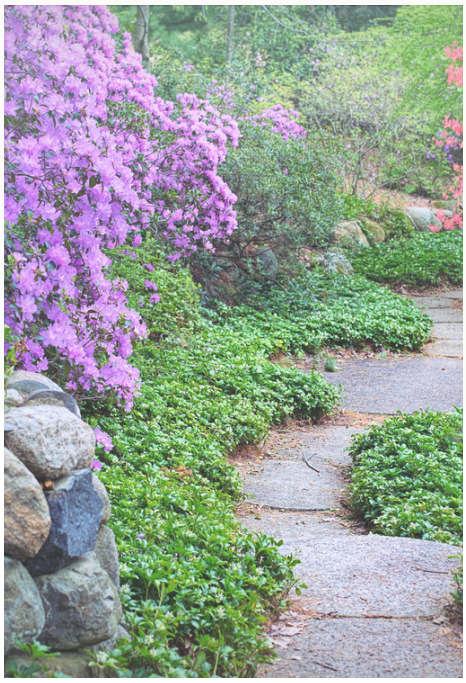
1. Getting Started



Welcome to the Abadtak's Schools' Kitchen Garden Guide!

At Abadtak, we believe in nurturing not just the minds but also the bodies of our students. Our Kitchen Garden Guide aims to empower young learners with the knowledge and joy of growing their own food, learning about ecosystems and services right within the school premises.

In this guide, we will embark on an exciting journey of discovery, exploring the wonders of gardening and sustainable practices. From building a garden, to composting, students will learn valuable lessons about nature, nutrition, and the importance of caring for our environment.

Together, let's sow the seeds of knowledge and cultivate a greener, healthier future for ourselves and the planet.

Let's dig in!

"Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has."

~ Margaret Mead

1.2 Rationale

As part of a sustainability initiative and Education for Sustainable Development (ESD), Schools should try to incorporate a kitchen garden within their premises. Kitchen gardening offers an educational experience for individuals, families, and communities. It fosters a deeper connection with nature, increases awareness of environmental issues, and promotes sustainable living practices.

It also offers Project Based Learning (PBL) opportunities that can be incorporated into the curriculum nationwide. As students engage in sustainable practices, it also develops:

- Increased academic performance 
- A change in attitude and behaviour 
- Critical thinking abilities 
- Experiential learning and hence transformative education 

Overall, kitchen gardening empowers individuals to take an active role in their food production, reduces their ecological footprint, and contributes to a more sustainable and environmentally friendly way of living. By promoting local, organic, and small-scale agriculture, kitchen gardening plays a vital role in building a more sustainable future for our planet.

1.3 Use This Guide

01 THIS GUIDE IS FOR

Schools heads, teachers, subject leads and anyone under the sun!

02 DIVISION

The guide is divided into sections and each section is further divided into subjections by a period. For e.g 5.1, means section 5, subsection 1.

03 IT IS INTERACTIVE!

There are clickable links to sections within the document and to other resources as well. Check all underlined text.

04 TOGGLE THE BOOKMARK

To return to the Table of Contents you may toggle the bookmark symbol at the end of the page.

THIS GUIDE HAS BEEN DEVELOPED SO THAT YOU MAY MAKE A KITCHEN AND SENSORY GARDEN IN UNISON WITH ONE ANOTHER FOR THE HOLISTIC DEVELOPMENT OF CHILDREN

1.4 Benefits of Kitchen Garden In Schools

1.4.1 Academic Integration

1

Hands-on Approach

A kitchen garden provides students with practical, experiential learning opportunities, allowing them to understand the natural processes, plant life cycles, and ecological relationships.

2

Cross-curricular Learning

A kitchen garden can be integrated into various subjects like science, math, art, and even literature, offering multidisciplinary learning experiences.

3

Learner Agency

Students can lead their own learning, explore themes and questions they have for themselves, and develop conclusions

1.4.2 Education for Sustainable Development

1

Sustainable Practices

By using organic farming methods and avoiding harmful chemicals, students learn about sustainable practices that protect the environment and promote long-term ecological balance.

2

Composting and Recycling

The garden can serve as a platform to teach students about composting, recycling kitchen waste, and reducing landfill contributions.

3

Water & Biodiversity Conservation

By exploring their environment, students and teachers can learn more about native species, and their importance, the water shed and more.

4

Community Engagement

Involvement in the garden can lead to peer and community connections, encouraging students to share their knowledge with others and engage in local sustainability initiatives. They will learn how to work in collaboration and build partnerships.

1.4.3 Self Awareness and Well Being

1

Stress Reduction

Gardening can have therapeutic effects, reducing stress, anxiety, and improving mental health among students and staff. While providing a sense of accomplishment and purpose.

2

Physical Activity

Working in the garden involves physical activity, promoting exercise and outdoor play, which contributes to better physical health and mental well-being.

3

Self Awareness

Students can develop their own values and principles, in relationship to the garden, and explore their relationship with self and the world.

4

Nutritional Awareness

Cultivating and consuming fresh produce from the garden can enhance students' understanding of nutritious food choices, leading to better eating habits and improved well-being.

5

Sense of Responsibility

Caring for the garden instills a sense of responsibility and accomplishment, boosting students' self-esteem and confidence.

1.4.4 LONG TERM IMPACTS

01

Community Involvement

Involving parents and the local community in the garden's maintenance and activities strengthens the school's ties to sustainability efforts beyond the school premises.

02

Preserving Biodiversity

Kitchen gardens preserve biodiversity with heirloom plants, creating green spaces, supporting local wildlife, and providing food and shelter for various species.

03

No Chemical Usage

Organic gardening uses natural pest control, companion planting, and beneficial insects to replace harmful pesticides, fostering eco-friendly practices.

04

Composting and Waste Reduction

Organic gardening uses natural pest control, companion planting, and beneficial insects, reducing reliance on harmful chemicals that harm the environment.

05

Air Quality Improvement

Plants absorb CO2, release oxygen in photosynthesis, enhancing local air quality by filtering pollutants in the surrounding environment.

06

Reduced Carbon Footprint

Homegrown food cuts food miles, decreasing carbon footprint from transportation and refrigeration, as produce travels shorter distances from farm to plate.

1.5 Logic Model

INPUT	OBJECTIVES	SHORT TERM OUTCOMES	LONG TERMS OUTCOMES
FOR TEACHERS			
PLANNING THE KITCHEN GARDEN	Encourage teachers to break away from established norms and teach in an interactive manner. Assist teachers with PBL	Understand how to conduct interactive learning with the students at the centre. Help students establish ownership for school activities and practices. Can teach content with real and tangible examples Able to promote learner agency	Integrate education for sustainable development in the curriculum. Develop their own sustainable attitude and behavior. Develop transferable skills Cascade skills to new teachers and other schools
ORGANIC KITCHEN GARDEN	Assist teachers to bring students outside of the classroom Assist teachers to develop cross curricular links		
FOR STUDENTS			
PLANNING THE KITCHEN GARDEN	Involve students in hands on activities and decision making	Develop ability to plan and think about spaces Student ownership in garden establishment and care Able to draw cross curricular links Understand the biological and environmental processes of nature, where food comes from, how to grow and cook food Begin developing observational and research skills Understand the difference between organic and inorganic Learn how to compost	Students may develop a lifelong sustainable mindset, becoming responsible and environmentally conscious citizens. Develop transferable skills Systems understanding Increased academic attainment Increased self awareness Think consciously so as to take on responsible actions and develop solutions with regards to the environment
ORGANIC KITCHEN GARDEN	Give students agency and empowering them to take learning into their own hands Bring students outside of the classroom Encourage critical thinking and sustainable initiatives		

2. Building Your Kitchen Garden

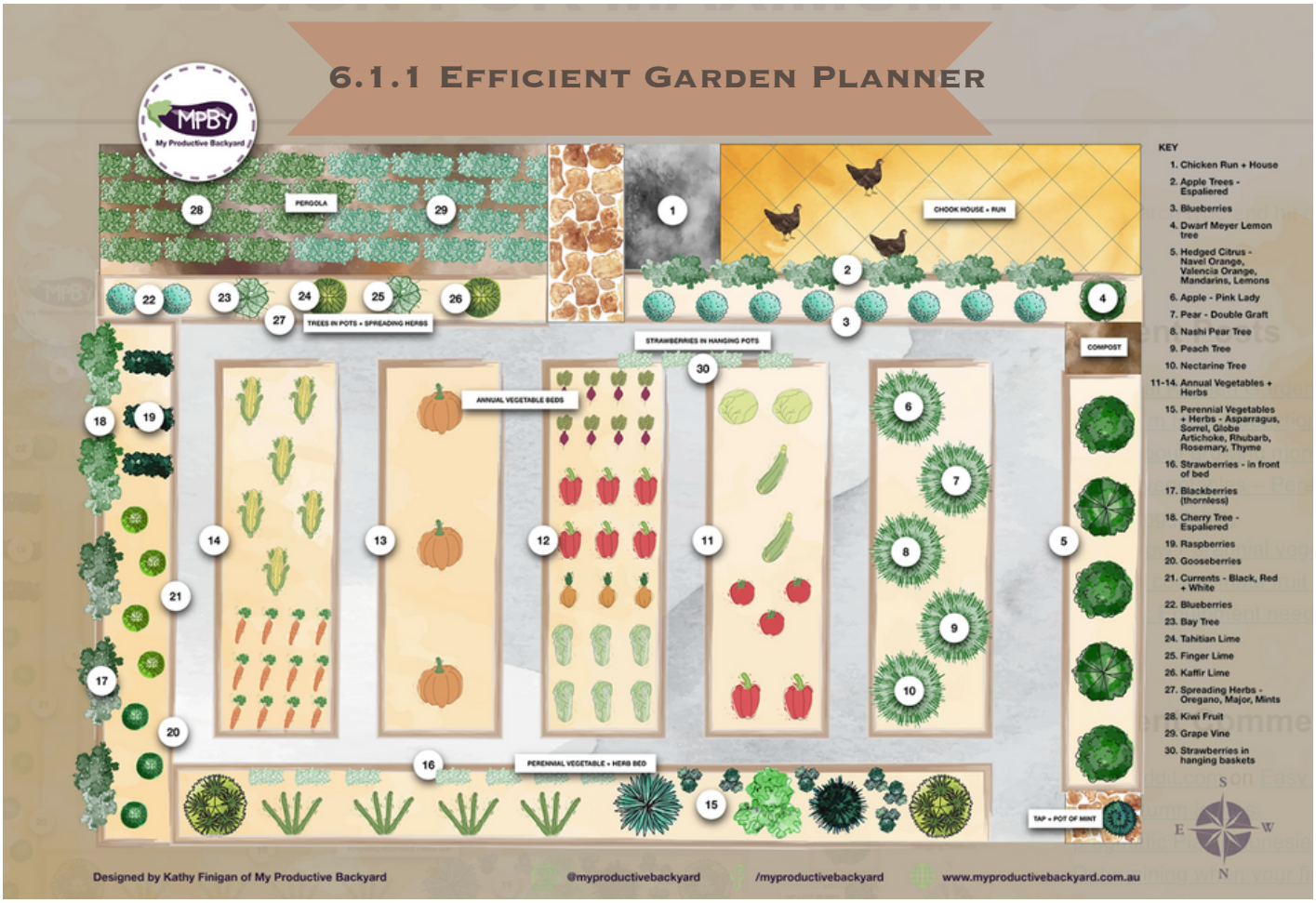
2.1 PLANNING YOUR GARDEN

It is always a good idea to have a small map drawn out that indicates how you will utilise the space. This can help you figure out:

- Where and how you intend on planting vegetables (for e.g some might require more sunlight than others)
- Where you wish to plant other native plants that might draw in some biodiversity
- How you will place your troughs and planters to optimise space
- Understand where to place vegetables in a manner that will make it efficient for you and students to harvest them

WHAT YOU'LL NEED

- ✓ Efficient gardening planner
- ✓ Site/location
- ✓ Water
- ✓ Planters
- ✓ Compost bin/ditch
- ✓ Plants/seeds



Re-imagining Space

Here is an example of how you can do this. It is good to chart out a map. It need not be so complex, just a simple layout with an idea of where you will sow certain plants, and how you intend on greening the space.

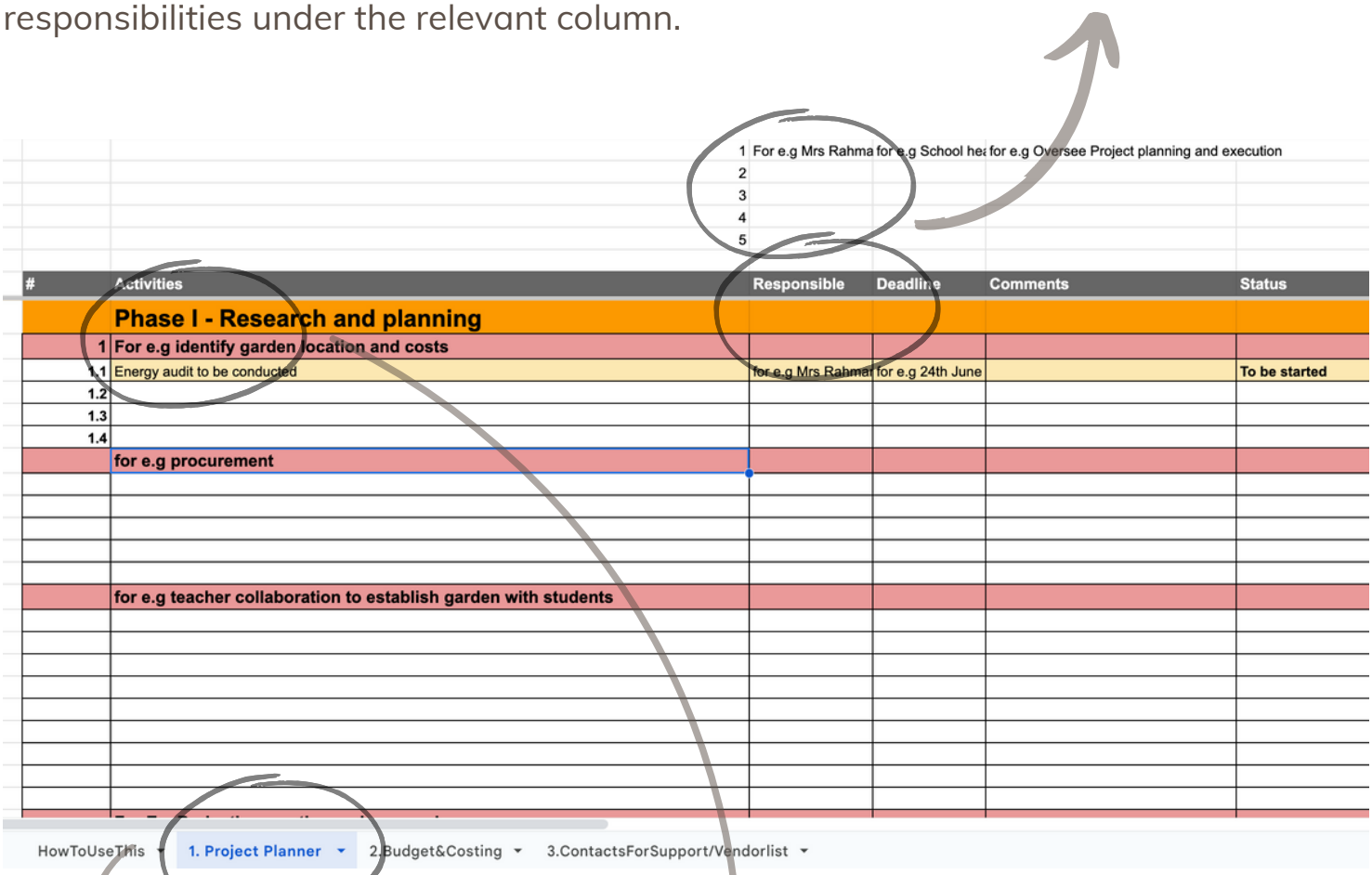
Use can use this **project planner** to help you plan your kitchen garden with seamless coordination. This will help keep track of every individual and their designated tasks. Could be even more helpful in a collaboration between teachers when involving students.

You will not have editing access to this document, you are advised to download it or make a copy!

Project Planner Snap Shot

Below is a quick view of how to view and use your project planner. You are advised to download the planner or make a copy! You can use this with students as well!

Make a list of team members and their role in the project and assign them their responsibilities under the relevant column.



Shift between sheets to find what you are looking for

Edit the columns as you require for your project

go to my Project Planner

2.2 Site/Location

Choose a convenient site in full sun with easy access to water and fertile, well-drained soil. Avoid areas near trees and large shrubs that will compete with the garden for sunlight, water, and nutrients.

If you do not have a lawn area, you can create your garden with wooden troughs (see section 2.3) that can be placed in an area where there is ample sunlight. If you are still pressed for space, a rooftop garden is ideal in such a situation.

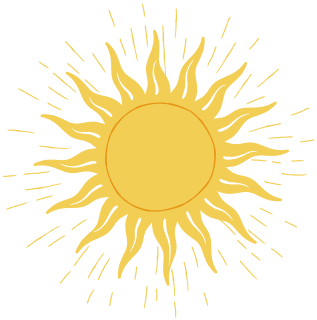
Pro Tip

You can create vertical garden spaces as well. See 'Vertical Gardening for small spaces'

Pro Tip

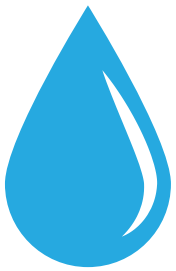
You can put wheels on your troughs if they need to be moved around according to the winter or summer months!

2.2.1 Ample Sunlight



- Most plants/vegetables need at least eight hours of direct sunlight.
- Plants that are grown for their leaves—including leafy greens such as lettuce, kale, chard, and spinach—and plants that we grow for their storage roots (such as radishes, turnips, and beets) can be grown in as little as six hours of sunlight but do much better with eight hours or more.
- Plants that we grow for their fruit, including tomatoes, squash, and cucumbers, need at least eight and do better with 10 hours of sunlight.
- However, there is the problem of **too much and intense sunlight** (especially in places like rooftops). For this reason, we recommend gaining a green gardening net that will help with too much glare!

2.2.2 Water



One of the most important aspects of gardening is water, which makes up 90 percent of a plant's weight. Plants have evolved to conserve water and attain it from the soil.

On average, vegetables need one inch of water per week, and you need to provide only what is not supplied by rain. Overwatering can also lead to insect and disease problems as well as washing nutrients away, converting a valuable garden resource into pollution in nearby streams or waterways.

> *Water the soil, not the plant*

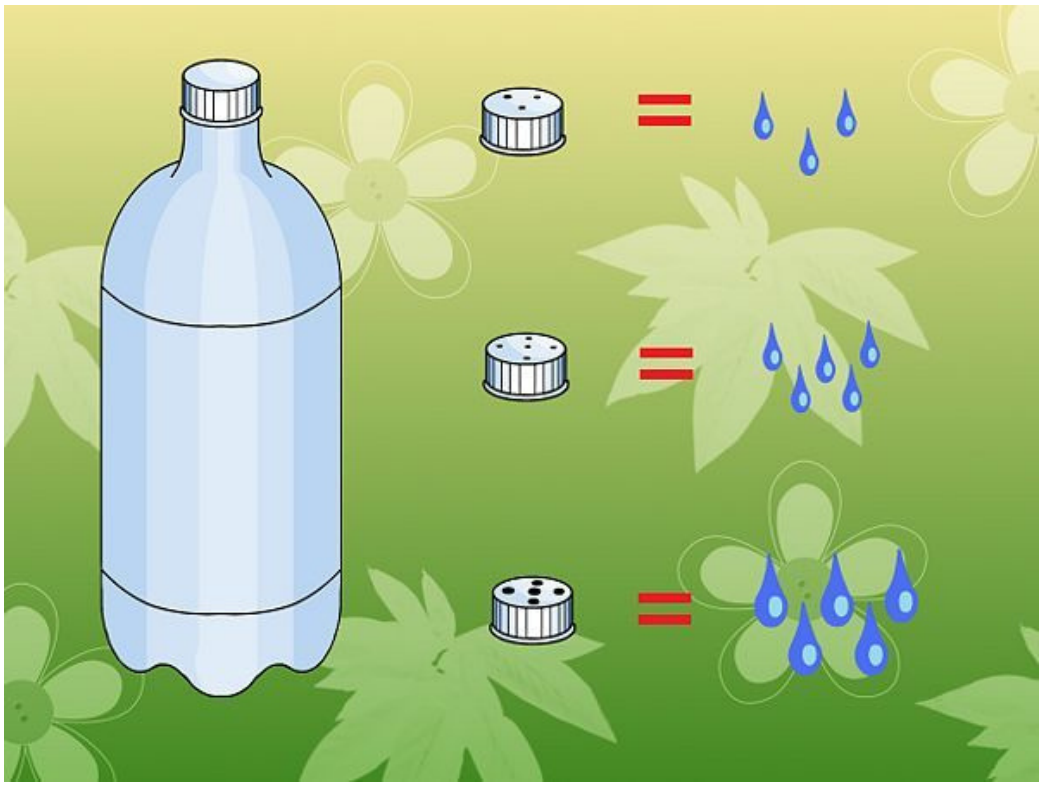
Many diseases are spread by water splashing on the leaves.

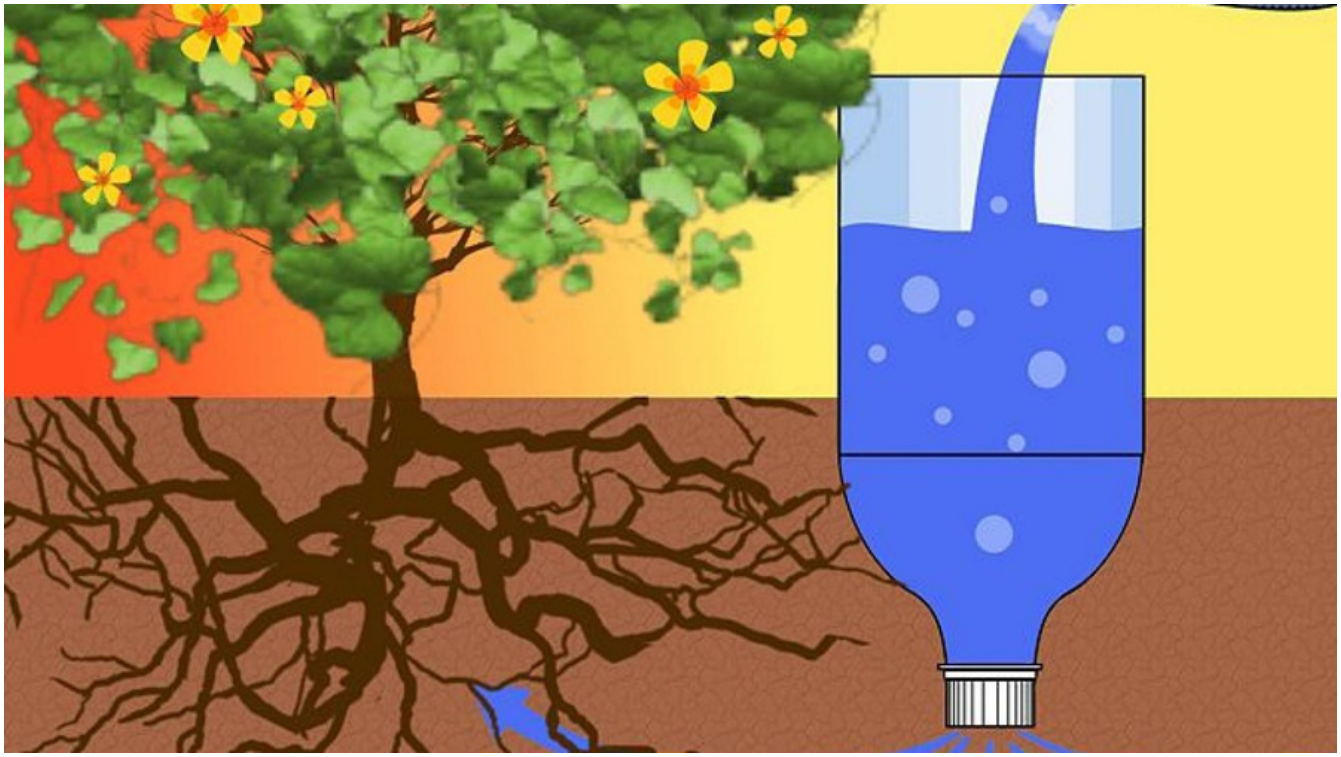
You do not need to water them everyday, and can apply simple sustainable strategies that will also aid sustainable thinking within students! Here are tips of how to do this.

- Drip irrigation with recycled plastic bottles
- Clay pot irrigation
- Other ways to use plastic bottles for watering plants

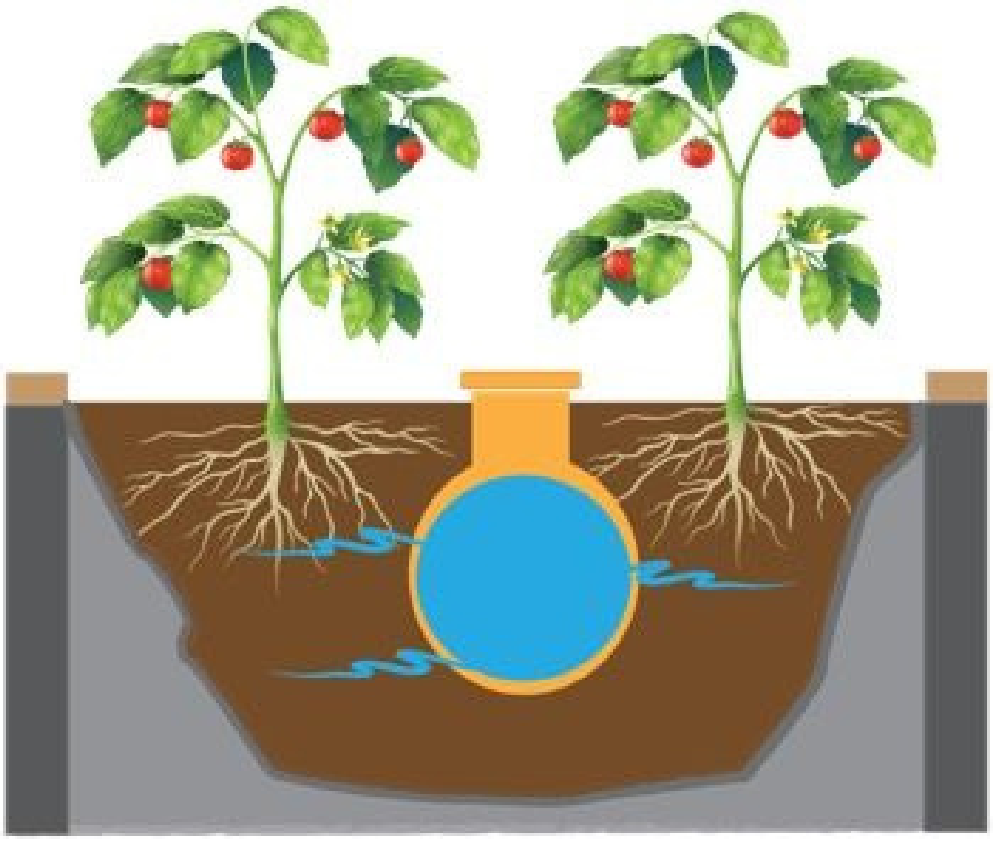
If you have a space of land, make sure you have access to water. Water is heavy and difficult to move, so locate the garden near a potable water supply, making it easy to water the garden properly. Dragging a hose hundreds of feet or carrying buckets of water across the yard every few days makes having a garden a lot more work. You want to make this as efficient as possible.

2.2.2(a)
Drip Irrigation with Recycled Bottles





2.2.2 (b) Clay Pot Irrigation



2.3 Planters

If you are not using land area, you will need planters for your plants. You can make wooden troughs and pots to create your garden space. **Be sure to line your troughs with jute or plastic lining** to assist with drainage or prevent leakage into the wood.

If you are using troughs, **consult with your carpenter whether it needs metal support**. Otherwise they will be unable to withhold the weight of the soil over time.

Cost Estimates

To build a 5 x 8 x 2 trough, it can cost up to PKR 28,000. For a 5 x 4 x 2 trough it can be up to PKR 13,000 including metal support. If you can find cheaper alternatives, great! Jute lining should not prove to be expensive, depending on the size of your trough, the cost will be minimal.

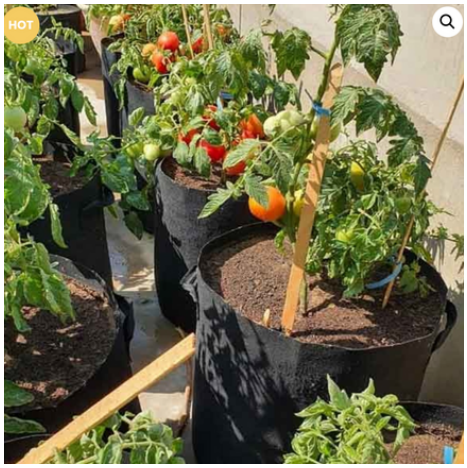
One bag or tora of soil can cost anywhere between PKR 100 to 300.

Disclaimer: These costs are based on estimates by carpenters in Lahore in 2023.

Note: Please avoid using cement planters at all costs as these do not allow soil to drain well, which will cause roots to rot.

Another great option are **fabric raised beds!** This is a much cheaper and less tedious alternative to wooden troughs, especially if you are in a hurry to get started,.

Trashit Pk has great options in sizes. They even have **grow bags** and **vertical planters** if you have limited space. These bags come with handles which make it easier for you to transport your bags around should they need to be moved.



Not to mention, you can purchase all other gardening essentials here! Such as organic compost, organic pesticide, tools and more!

Cost Estimates

Costs for these vary from PKR 100 to PKR 1200.

Visit Trashitpk

2.4 Composting

Composting is an excellent way to recycle organic materials, create nutrient-rich soil and keep your garden sustainable. There are two ways you can include composting in your school. They each have their own benefits.

1. Compost Bin

These can be easily placed around the school where students can access them. They keep pests out and are easy to manoeuvre and carry for tossing. It is also a great opportunity for students to observe composting over a span of a month and see for themselves how materials transform to organic matter.

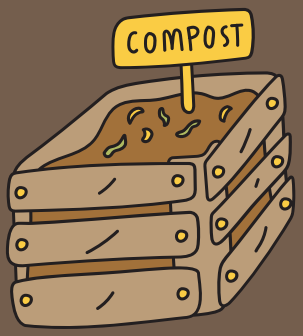
Though this kind of compost does not have an unbearable odour, it is hard to control what kids/personnel pile in. Any wrong item (such as cooked food) thrown in will most definitely rot and cause stench.

2. Compost Ditch

This can be a more convenient way for students and staff to simply toss in their organic materials. It can be in a vicinity far away from classrooms, so if there is an odour, it will be far away.

However, this kind of compost will require some manual labour as you will need a shovel to sift out the compost from the bottom of the pile.

2.4.1 How to Compost



Step-by-Step Process

1 Prepare the Ban

Clean the bin thoroughly, removing any labels or residue. Use a nail or a small drill to create several small holes in the bottom and around the sides of the can. These holes will allow for proper aeration and drainage of excess water.

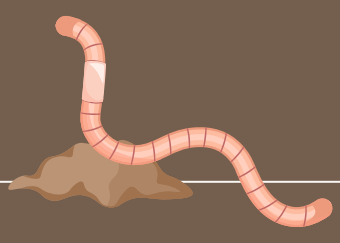
2 Choose locations

Decide how many of these would you like, and place the bin in a convenient location, preferably outdoors or in a well-ventilated area. Ensure it's easily accessible for adding kitchen scraps regularly.

3 *Layer your organic matter*

Start by adding a layer of brown materials, such as dried leaves, shredded paper, or torn cardboard, to the bottom of the tin can. This layer will help create airflow and prevent the kitchen scraps from becoming too compacted.

Now add a layer of ‘green waste’. Collect kitchen scraps like fruit and vegetable peels, coffee grounds, tea bags, and eggshells. Avoid adding meat, dairy, oily foods, or pet waste, as these can attract pests or take longer to compost.



Step-by-Step Process

4 Mix Green and Brown Materials

Continue adding your green and brown material. Layer the kitchen scraps with brown materials to maintain a balanced compost mix. For every layer of kitchen scraps, add an equal or slightly larger layer of brown materials.

5 Moisten the Compost

Every now and then, sprinkle some water onto the compost layers to ensure they are damp but not waterlogged. Composting microorganisms require moisture to break down the organic matter effectively.

Check the compost regularly to ensure it remains moist but not soggy. If it seems too dry, add a little water, and if it's too wet, mix in more brown materials to balance it.

Pro-tip: If you would it to compost faster, you can add some fermented rice water.

6 *Cover with the Lid*

Keep the lid on the bin to keep pests out and to trap heat and moisture inside, which will help accelerate the composting process.

Step-by-Step Process

7 Turn the Compost

Every few days, give the compost a gentle shake or turn it to aerate the contents. This helps speed up decomposition and prevents odors.

8 Harvest the Compost

After a few weeks, depending on the materials used and environmental conditions, the compost should be ready. It will appear dark, crumbly, and earthy-smelling. Transfer the compost to your garden or container plants, and start a new compost batch in the bin!

Access a "What to Compost" Poster Here

You can print or digitally display your poster in your classrooms

2.5 Maintaining your Garden

Its Simple Enough

With the right care and attention, a garden should be able to sustain itself! Especially if it has water, sunlight and compost. You do not need to add fertilizer if you are using compost.

However remember, nature is unpredictable and we cannot tame it. This is also a teaching process for children, that there are many aspects of life that we cannot possibly imagine, yet have to adapt and tailor our processes and thinking.

Here are some ways to handle those unpredictable pests.

Use Ogranic Pesticides

Pesticides and fertilizers cause other major environmental damage. Chemical fertilizers further deplete the soil of nitrogens, so that you continue buying more of it. Pesticides/herbicides kill other beneficial plants and insects, further degrading biodiversity. Creating unharmful or less harmful pesticides and fertilizers is necessary for several reasons:

1**. Environmental Preservation:**
Conventional pesticides, especially synthetic ones, can have adverse effects on non-target organisms, such as beneficial insects, birds, and aquatic life. They can also contaminate soil and water. Developing unharmful pesticides helps reduce these negative environmental impacts.

2. **Human and Animal Health:**
Pesticides can pose risks to human health when residues are present on food or when they are inhaled during application. Less harmful pesticides are safer for both farmers and consumers.

Plant Beneficial Species

For every one pest, there are 1700 beneficial species. Each plant also contributes to the soil and air in different ways. If you research, you can find what to plant with tomatoes for instance to protect it from pest.

Organic Pesticide Recipe

Ingredients

1. One teaspoon baking soda
2. One quart (4 cups) of water
3. A few drops of liquid soap (preferably mild, biodegradable soap)

1. Mix the Ingredients: In a container, combine the baking soda and water. Stir or shake well to dissolve the baking soda completely.
2. Add Soap: Add a few drops of liquid soap to the mixture. The soap helps the solution adhere to plant leaves and pests.
3. Transfer to Spray Bottle: Pour the mixture into a clean spray bottle. Make sure the spray bottle is clean and has no residues from previous chemicals.
4. Spray on Affected Plants: Spray the solution directly onto the leaves of plants that are affected by fungal diseases (such as powdery mildew) or soft-bodied pests like aphids.
5. Repeat as Needed: You may need to reapply the solution every 7-10 days or after rainfall, as it can be washed off. Continue treatment until the problem is under control.

This baking soda-based pesticide is a gentle and eco-friendly option for controlling some common garden problems. However, for more serious infestations or diseases, you may need to consider other treatments or consult with a local gardening expert for tailored solutions.

There are many other ideas available online as well!

3. ENGAGE STUDENTS

In both the planning and maintenance process, determine which group of students you would like to work with. This could be based on grade level, clubs or a volunteer program. You should try and ensure maximum engagement.

By involving students, you give them more ownership and hence a need to be collectively responsible for the garden as well.

Keeping the following steps in mind. Sit down with your students to hash out a garden plan in mind.

This may involve some closs collaboration between teachers and cordinators to enure a seamless effort.

Why?

This will:

- **Increase their leadership, decision making and thinking skills**
- **Encourage them to think about partnerships, teamwork and collaboration**
- **Help them design and assess spaces with sustainability in mind**
- **Give students ownership in the garden and hence a sustained sense of effort and responsibility**

INTEGRATING THE GARDEN INTO

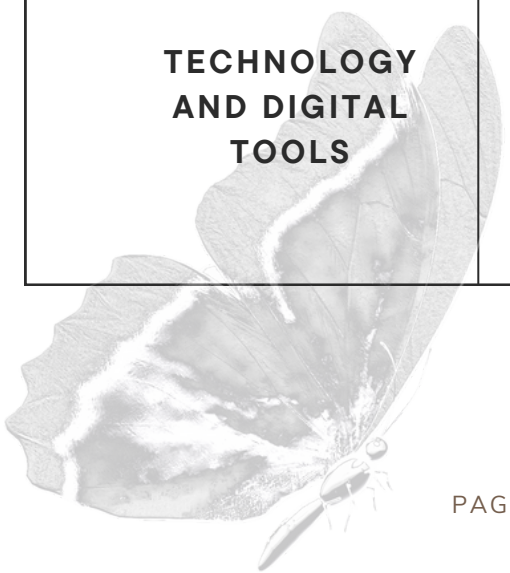
3.1 CURRICULA

SCIENCE (BIOLOGY)	Students can learn about plant life cycles, photosynthesis, ecosystems, habitats and processes. Observing beneficial insects and pollinators in the garden introduces the concept of symbiosis and the importance of conservation.
MATHEMATICS	Gardening involves measuring and spacing plants correctly, providing real-life applications for concepts like area, perimeter, and geometry. Students can take out calculations wherever needed for and monitor growth using charts and graphs.
LANGUAGE	Students can write essays, poems, journal entries, reflections or even take to story telling in the garden space Reading fables and parables related to gardening can emphasize moral lessons and character development.
SOCIAL STUDIES	Sustainability, local flora fauna, local challenges, soil types, various traditions can all be explored within a kitchen garden.

INTEGRATING THE GARDEN INTO

CURRICULA

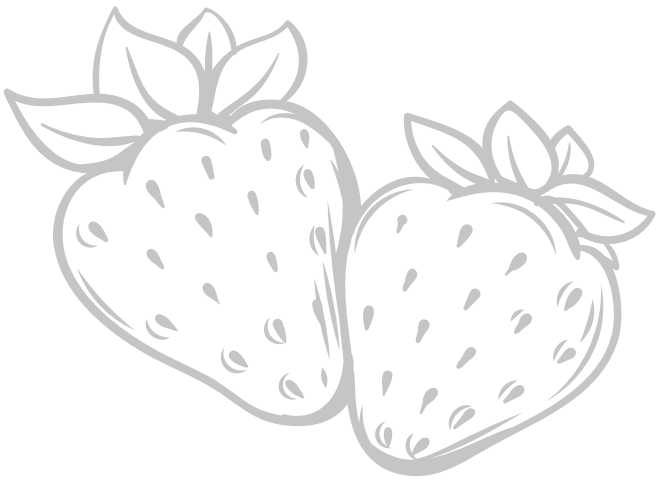
ART AND CRAFTS	Students can create garden journals, sketch plants, or paint scenes from the garden, incorporating artistic expression into the learning process. Creating garden-themed artwork adds a creative touch to the gardening experience.
PHYSICAL EDUCATION	Gardening involves physical activity, helping students develop motor skills, understand the importance of exercise and staying active.
HEALTH AND NUTRITION	Kitchen gardening can be linked to discussions about healthy eating, the benefits of fresh produce, and the importance of a balanced diet.
TECHNOLOGY AND DIGITAL TOOLS	Students can use technology to research plant species, explore weather patterns, and access gardening apps for assistance. They can even understand how to make use of spreadsheets to document and produce data.



INTEGRATING THE GARDEN INTO

CURRICULA

PSHE	The garden can be an excellent space to conduct wellness activities, including self awareness exercises, meditation or to instill empathy with nature.
ENVIRONMENTAL STUDIES	The kitchen garden can serve as a hands-on model for discussing environmental issues like sustainability, waste reduction, and the impact of food miles. Studying composting and waste reduction ties into lessons on recycling and conservation.



4. Promoting Biodiversity in the Garden

Creating a garden with native plants from the Indian subcontinent can be a wonderful way to introduce students to the region's biodiversity and stimulate their senses.

Once established, native gardens typically require less maintenance compared to traditional gardens with non-native plants. This is because native plants are adapted to the local environment and can thrive with minimal intervention. Somethings to consider:

1) Consider incorporating plants that cater to various senses such as smell, sight, touch, and taste, to provide a diverse sensory experience for the students.

2) Additionally, educate the students about the cultural and ecological significance of these plants to foster a deeper appreciation for native flora.

3) Including native plants will not only stimulate the senses and increase regional flaura knowledge but encourage local biodiveristy. By using indigenous species, native gardens provide habitat and food sources for native wildlife, including birds, butterflies, bees, and other pollinators. This, in turn, contributes to the overall health and resilience of local ecosystems.

4) Native plants are well-adapted to the local climate and soil conditions, requiring less water once established compared to non-native species. They have evolved to survive with the natural rainfall patterns of the region, reducing the need for additional irrigation. Using native plants can help conserve water resources and promote more sustainable gardening practices.

4.1
PLANT SELECTION

Colorful flowers and foliage

Include a variety of plants with vibrant colors to stimulate visual senses (see appendix 1 for plants to avoid).

Textures

Incorporate plants with different textures, such as fuzzy leaves, smooth bark, or rough surfaces, to encourage tactile exploration.

Fragrant plants

Choose aromatic plants like lavender, jasmine, or herbs to stimulate the sense of smell.

Edible plants

Consider including edible plants like herbs, vegetables, or fruit trees to engage taste and promote healthy eating habits

Native plants

Opt for native plants as they are better adapted to the local climate and require less maintenance.

4.2 What to Plant?

5.1.1 Suggested native plants with strong scents and colour

Jasmine (Jasminum Officinale)

Also the national flower of Pakistan, well known for its fragrance. This plant does well in most climatic conditions, usually flowering in the summer season. Dried jasmine flowers can be used to make jasmine tea in the school.

Rose bush

Frequently known as the ‘desi gulab’, it is a bush that flowers through summer. Rose essence is used to make rooh afza, a traditional cooling drink in the summer season. These flowers are edible.

Marigold (Tagetes erecta)

Colorful and aromatic flowers, usually flower during the spring season. They are essential parts of various traditions, festivals, and rituals worldwide

Tulsi (Ocimum sanctum)

Aromatic herb with spiritual significance, this plant also acts as a natural mosquitoe repellent, aiding cough, asthma, diarrhea, fever, dysentery, arthritis etc, .

Hibiscus (Hibiscus rosa sinensis)

Colorful and visually appealing flowers, hibiscus is a flowering plant native to tropical Asia. It is commonly consumed in teas made from its flowers, leaves, and roots.

4.2 Suggested native plants with strong scents and colour

Aloe Vera (Aloe barbadensis miller

Aloe vera is a thick, short-stemmed plant that stores gel like substance in its leaves. It is best known for treating skin injuries, but it also has several other uses that could potentially benefit health.

Lemon grass (Cymbopogon citratus)

Lemon grass is a widely used herb in tropical countries, especially in Southeast Asia. The essential oil of the plant is used in aromatherapy.

Plumeria (Plumeria rubra)

Often profuse and very prominent, they are strongly fragrant, and have five petals. The flowers give off their fragrance in the morning and in the evening.

Betel leaf (Piper betle)

It is an evergreen, dioecious vine, with glossy heart-shaped leaves and white catkins. Betel plants are cultivated for their leaves for our cultural snack of paan.

Ashwagandha (Withania somnifera)

Commonly known as ashwagandha or winter cherry, it is an evergreen shrub. The plant, particularly its root powder, has been used for centuries in traditional Indian medicine.

4.3 Suggested Native Trees (North & Central)

Though trees may not grow in a kitchen garden, they can be planted in other areas of your school. As schools become more and more concrete, school leaders need to think about how to green their spaces.

North Pakistan (Including Khyber Pakhtunkhwa and Gilgit-Baltistan)

The best time to plant these trees is during the fall or early spring when temperatures are milder, and the soil is moist. This timing allows the plants to establish their root systems before the hot summer months arrive.
1) Deodar (Cedrus deodara) (national tree of pakistan)
2) Pine (Pinus roxburghii and Pinus wallichiana)
3) Walnut (Juglans regia)
4) Rhododendron (Rhododendron arboreum) (Potentially toxic if ingested)
5) Juniper (Juniperus species)
6) Apricot (Prunus armeniaca)
7) Cherry (Prunus cerasus)
8) Chilgoza Pine (Pinus gerardiana)
9) Poplar (Populus ciliata)
10) Willow (Salix acmophylla)

Central Pakistan (Including Punjab province)

The ideal time to plant these trees is during the late fall or early spring. This allows the trees to take advantage of cooler temperatures and ample moisture in the soil for better root development.
1) Neem (Azadirachta indica)
2) Banyan (Ficus benghalensis)
3) Mango (Mangifera indica)
4) Mulberry (Morus alba)
5) Kikar (Acacia nilotica)

Ease of Acquisition: Neem, Banyan, Mango, and Mulberry trees are readily available and can be easily acquired from nurseries.

4.3 Suggested Native Trees (South)

South Pakistan (Including Sindh and Balochistan)

1) Babul (Acacia nilotica)
2) Rohida (Tecomella undulata)
3) Kandi (Prosopis cineraria)
4) Date Palm (Phoenix dactylifera)
5) Wild Olive (Olea ferruginea)

Ease of Acquisition: Babul, Rohida, Kandi, and Date Palm trees are commonly found in these regions and can be acquired with relative ease.

The best time to plant these trees is during the cooler months of late fall or winter when temperatures are more comfortable for planting, and the soil retains some moisture.

For teaching purposes, you can plant some of these in larger clay pots. Use it as an opportunity to teach about local trees and their characteristics.

Deodar

Neem

Babul

4.4 Native Plants that Draw Local Butterflies (Central)

Central Pakistan (Including Punjab Province)

Common Butterflies: Plain Tiger (Danaus chrysippus), Common Leopard (Phalanta phalantha), Painted Lady (Vanessa cardui), Common Jezebel (Delias eucharis).

Attracting Plants: Lantana (Lantana camara), Zinnia (Zinnia elegans), Marigold (Tagetes species), Cosmos (Cosmos bipinnatus), Salvia (Salvia species).

Ease of Acquisition: Lantana, Zinnia, Marigold, and Cosmos are relatively easier to acquire as they are common ornamental plants found in local nurseries and garden centres across Central Pakistan.

NOTE: Lantana (Lantana camara) is toxic if ingested.

Late fall (October to November) and early spring (February to March) are ideal planting times. During these months, temperatures are milder, and the weather is more conducive to plant growth. The soil retains some moisture from the winter season, making it easier for plants to establish their root systems.

Plain Tiger

Common Leopard

Painted Lady

4.4 Native Plants that Draw Local Butterflies (North)

North Pakistan (Including Khyber Pakhtunkhwa and Gilgit-Baltistan)

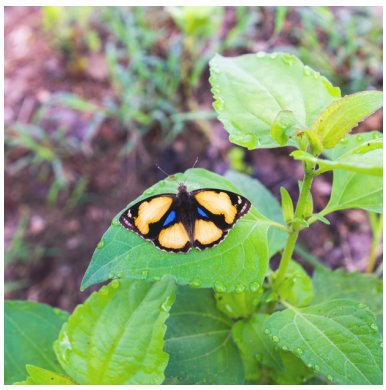
Common Butterflies: Common Rose (Pachliopta aristolochiae), Indian Fritillary (Argynnis hyperbius), Yellow Pansy (Junonia hierta), Painted Lady (Vanessa cardui).

Attracting Plants: Marigold (Tagetes species), Zinnia (Zinnia elegans), Verbena (Verbena species), Pentas (Pentas lanceolata), Milkweed (Asclepias species).

Ease of Acquisition: Marigold, Zinnia, and Verbena are commonly available in nurseries and markets in North Pakistan. While Pentas and Milkweed may be less common, they can be found in specialised nurseries or through online sellers.

Late fall (October to November) and early spring (February to March) are ideal planting times. During these months, temperatures are milder, and the weather is more suitable for plant growth. The soil retains some moisture from the winter season, providing a good environment for the plants to establish their root systems.

Common Rose



Yellow Pansy

Indian Fritilllary

4.4 Native Plants that Draw Local Butterflies (South)

South Pakistan (Including Sindh and Balochistan)

Common Butterflies: Common Grass Yellow (Eurema hecabe), Lemon Emigrant (Catopsilia pomona), Common Tiger (Danaus genutia), Pioneer (Anaphalis aurota).

Attracting Plants: Mexican Sunflower (Tithonia diversifolia), Lantana (Lantana camara), Zinnia (Zinnia elegans), Marigold (Tagetes species), Cosmos (Cosmos bipinnatus).

Ease of Acquisition: Mexican Sunflower, Lantana, Zinnia, Marigold, and Cosmos are relatively easier to acquire in South Pakistan. Lantana is especially common in this region due to its adaptability to warm climates.

Late fall (October to November) and early spring (February to March) are ideal planting times. During these months, temperatures are more moderate, and the weather is favourable for plant growth. The soil retains some moisture from the winter season, providing a conducive environment for the plants to establish their root systems.

Lemon Emigrant

Common Grass Yellow

Pioneer

5. Garden Ideas

5.1 Recycling Materials for Gardening

Make your own micro-farm with recycled plastic bottles

5.1 Recycling Materials for Gardening

5.2 Vertical Gardening for Small Spaces

5.2 Vertical Gardening for Small Spaces

Felt gardening

Involves creating pockets with felt sheets to hold soil and allow roots to spread within it. The felt acts as the growing medium for your vertical garden plants, minimising soil use while retaining water.

Here you can learn more about this type of gardening.

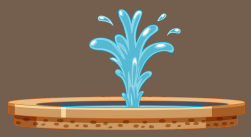
Be creative

You can use colours or even place leaves specifically to create patterns in your garden as well.

5.3 Sensory Elements

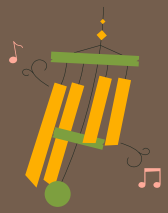
1 Water features

Incorporate a small pond, fountain, or water play area to provide visual interest and soothing sounds. This can also feature as a bird bath.



2 Wind chimes

Hang wind chimes in different areas of the garden to create gentle sounds when the wind blows



3 Seating areas

Install comfortable seating areas for students and teachers to relax and enjoy the garden.

4 Texture panels

Attach various textured materials, such as rough wood or smooth stones, to panels for tactile exploration

5 Raised beds

Construct raised beds to facilitate gardening activities and allow students to get hands-on experience with plants.

6 Musical Instruments

Include commercially produced instruments or collect and repurpose items suitable for creating sounds (see section 6.2)

6. Resources

Quick Garden Hacks and Tips

1) Creative Explained
2) Joe's garden
3) 7 Tips to Green Your Classrooms
4) Pinterest Board

Sensory Elements

1)Experiencing a sensory garden
2) 6 tips to build a sensory room
3) Autism sensory gym

DIY Water Features

1) Terracota DIY fountain
2) DIY automatic water fountain: without electricity and reusing plastic bottles

Free Lesson Plans and Guides

1) Edible Schoolyard lessons for learning in school and at home
2) Edible Schoolyard student engagement workbook

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Contact us at abadtak.pk@gmail.com or follow us on social media