URBAN SCHOOL GARDEN

A TEACHER'S GUIDE

2025

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Urban school garden, a teacher's guide

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Table of contents

Foreword

At the **Eco-Schools programme**, we strive to bring the values of **sustainability**, **responsibility**, and a **connection with nature** closer to children and young people through various environmental educational activities. School gardens play a key role in these efforts, as they combine hands-on learning, environmental awareness, and cooperation.

This guide is designed as a **tool for teachers** who want to inspire students in an active and inclusive way to explore gardening. While originally intended for teachers in **urban schools**, it can just as easily be used by others. The guide serves as a collection of useful tips for establishing and maintaining (urban) school gardens, a resource for promoting sustainability and local food production, and a guide to **understanding the importance of food self-sufficiency**.

Remember, a school garden is much more than just a place for growing plants—it is a space where the foundations of a sustainable relationship with nature and the community are built. It is where young people gain skills, knowledge, and habits that will stay with them for life.

May the **Urban School Garden** guide serve as a source of **inspiration and support** for all those who believe in the power of education for sustainable development. With school gardens, create a space where young learners develop respect for nature, learn the value of cooperation, and understand that even the smallest step toward sustainability contributes to a better future.

GREGOR CERAR, NATIONAL COORDINATOR OF THE ECO-SCHOOL PROGRAMME SLOVENIA

School garden – An outdoor classroom

School gardens have long played an important role in education, offering direct contact with nature and hands-on learning about food production, processing, and responsible environmental care. In today's world, where many children and young people are increasingly disconnected from the natural environment, school gardens serve as essential spaces for fostering an understanding of natural cycles, sustainable living, and food self-sufficiency.

In urban environments, where green spaces are often limited, school gardens gain even greater significance. They provide students–especially those without regular access to nature–with the opportunity to experience plant growth, understand life cycles, and learn where their food comes from.

More than just a place for growing vegetables, fruits, and herbs, **urban school gardens function as holistic learning environments,** integrating subjects like science, mathematics, arts, and even physical education.

Beyond academics, school gardens positively impact students' health and well-being by encouraging outdoor activity, promoting physical and mental wellness, and fostering a healthy relationship with food. Students who participate in growing fruits and vegetables are more likely to incorporate them into their diets, leading to a healthier lifestyle.

School gardens also play an important social role, fostering cooperation, teamwork, and mutual support, which strengthens students' social skills. In cities, where community connections are often weaker, gardens become a space for bonding and community building. Through working in the garden, students learn values such as responsibility, care, and collaboration, contributing to their personal and social development.

School gardens also improve urban environments. The green spaces created by school gardens improve air quality, enhance biodiversity, and contribute to the regulation of urban microclimates, making cities healthier and more sustainable places to live.

Teachers play a key role in guiding students through these experiences. By leading by example and sharing knowledge, you can help students develop a responsible attitude toward nature, understand the importance of sustainable food production, and encourage them to take part in caring for the garden.

The Urban School Garden Guide explores the unique role of school gardens in urban education, connecting children with nature while equipping them with skills for a sustainable future. This guide provides practical strategies to help teachers engage students in gardening activities that foster a love for nature, environmental responsibility, and hands-on learning about sustainability. Inside, you'll find guidelines, tips, and expert insights to help establish or expand your urban school garden. Whether it's herbs in pots, fruits and vegetables in raised beds, or a traditional soil-based garden, **there's always a way to make space for a school garden**—so no more excuses!

By using this guide, you and your students will transform your urban school garden into a **thriving learning space**, where students gain skills, knowledge, and habits that will last a lifetime.

CHAPTER 1

Finding space

The first step in establishing an urban school garden is choosing a suitable location, which can be quite a challenge in a city environment. The garden's placement significantly affects the success of plant growth and yields, as the selected space must provide optimal conditions for plant growth, easy access (even during school holidays), and protection from potential disturbances. If the school lacks fencing, an unprotected garden might not last long, so considering security measures is essential for its sustainability.

Peas, spinach,
and lettuce can also grow well
even with less sunlight.

When choosing a location for the garden, ensure that it is easily accessible for both teachers and students.

It should be located **close to classrooms** or other school areas, so students can easily access it on a regular basis. If space is extremely limited, consider setting up a garden **inside a classroom, cafeteria, terrace, rooftop, or even along staircases**.

Most crops require **plenty of sunlight** to grow well. Choose a location that gets **at least six hours of sunlight daily**. If plants don't receive enough light, yields will be lower, and they will be more prone to pests and diseases. For shadier areas, opt for vegetables that tolerate low light, such as peas, spinach, and lettuce.

Plants also require regular watering, so easy access to water is one of the key factors to consider when choosing a location for your urban school garden.

Choose a location **near a water source**, as regular watering is essential for plant growth. Consider **collecting rainwater**, which is the most sustainable and environmentally friendly solution.

Soil quality is just as important. If the soil is rich in organic matter and fertile, you can plant directly in the ground. However, if the soil quality is poor, consider alternative solutions such as **raised beds** or **planter boxes**, which allow for better soil control and improved growing conditions.

Ensure **safety** by thoroughly inspecting the site, **removing any toxic plants or hazardous objects**.

Consider the **aesthetic appeal** of the urban school garden. It should blend harmoniously with the school environment or enhance it. If space allows, think about adding **benches, informational signs, a rainwater collection system, or insect hotels** to make the garden more engaging.

It’s a good idea to **involve students** in choosing the garden location, so they feel more included and motivated to participate in future activities.

WITH A CAREFULLY SELECTED SPACE THAT IS ACCESSIBLE, SAFE, AND SUITABLE FOR PLANT GROWTH, THE SCHOOL GARDEN WILL BECOME AN INTEGRAL PART OF THE URBAN SCHOOL ENVIRONMENT. IT WILL PROVIDE STUDENTS WITH DIRECT CONTACT WITH NATURE AND OFFER VALUABLE LESSONS ON URBAN AGRICULTURE AND FOOD SELF-SUFFICIENCY.

CHAPTER 2

Tools and supplies

Every gardener, whether a child or an adult, needs appropriate tools for working in the garden. Choosing the appropriate gardening equipment is essential for successful and safe gardening. With proper tools and careful handling, students can fully enjoy growing plants while gaining valuable hands-on experience–knowledge they can apply throughout their lives.

2.1

How to get tools?

GARDENING TOOLS CAN BE OBTAINED IN VARIOUS WAYS:

1. Purchase – The simplest solution, but often the most expensive.

2. Donations – Ask students' parents if they have extra (or unused) tools they could donate to the school.

3. Local community – Neighbors or local farmers might be willing to contribute tools. Be sure to check the quality of donated tools to ensure they are safe and functional.

4. Second-hand tools – Check online marketplaces or flea markets where you can find high-quality second-hand tools at a lower cost.

2.2

Suitability and quality of tools

When choosing gardening tools, **it is essential that they are safe and suitable for students**. Ensure that students can **comfortably hold and use the tools**, and allow them to test them while learning basic handling techniques. **The quality of gardening tools** is also crucial. Avoid oversized tools–smaller tools are often more practical and safer for children. Follow the principle "**Less is more**"–choose only the tools you truly need. After each use, **clean and store** the tools properly. Regular maintenance and careful handling will ensure **long-term and safe** use for everyone.

2.3

List of gardening tools

FOR SUCCESSFUL GARDENING IN A SCHOOL GARDEN, WE RECOMMEND THE FOLLOWING BASIC TOOLS:

1. **Shovel** – used for digging and transporting soil.
2. **Hoe** – for breaking up and aerating the soil.
3. **Garden fork** – ideal for loosening and aerating soil.
4. **Rake** – for leveling soil and clearing debris.
5. **Dibber** – tool used to create holes for planting seeds or seedlings.
6. **String Line** – for marking straight planting rows.
7. **Hand Trowel** – for precise planting.
8. **Short-Handled Fork** – suitable for easy use by younger children.
9. **Cultivator** – for preparing and conditioning soil.
10. **Dutch Hoe** – for weeding.
11. **Sprayer** – for plant protection.
12. **Wheelbarrow** – used to move soil, compost, and other gardening materials.
13. **Pruning Shears** – for trimming plants.
14. **Double Hoe, Soil Loosener, Weeder** – for aerating and weeding.
15. **Large Shovel** – for heavier soil and sand work.
16. **Watering Can** – for watering plants.
17. **Large Garden Shears** – for precise pruning.
18. **Gloves** – for hand protection.
19. **Seed Tray, Biodegradable Tray with Compartments** – for seed planting and seedling cultivation.
20. **Garden Stakes** – for marking and supporting plants.

BY FOLLOWING THE ABOVE ADVICE AND GUIDELINES, YOU WILL BE ABLE TO ESTABLISH A SAFE AND PRODUCTIVE ENVIRONMENT FOR GARDENING IN YOUR SCHOOL GARDEN.

Proper tools and their correct use enable students to garden successfully, learning through hands-on experience while developing respect for nature and their surroundings.

Appendix 1:

Gardening tools picture cards

We’ve created visual cards featuring gardening tools to help younger students identify them more easily.

CHAPTER 3

Soil preparation

Soil preparation is one of the fundamental steps in establishing an urban school garden, incorporating both technical and educational aspects. Through hands-on gardening, students learn essential skills such as identifying soil types, soil turning, and composting. By integrating these activities into the school garden, you will not only enhance soil conditions for plant growth but also promote environmental responsibility among students.

3.1

Know your soil

THE FIRST STEP TO SUCCESSFUL GARDENING IS TO IDENTIFY THE TYPE OF SOIL YOU'RE WORKING WITH. EACH TYPE HAS ITS OWN CHARACTERISTICS THAT AFFECT THE PLANTS YOU GROW. UNDERSTANDING THE SOIL IN YOUR SCHOOL GARDEN IS CRUCIAL, AS IT ALLOWS TEACHERS AND STUDENTS TO PROPERLY PREPARE THE GROUND AND ENSURE SUCCESSFUL PLANT GROWTH. THE MOST COMMON TYPES OF SOIL ARE:

Sandy soil

Sandy soil is dry, grainy, and highly permeable, making it suitable for drought-tolerant plants. However, because it loses nutrients quickly, it requires frequent enrichment with organic matter.

How to identify it?
Feels grainy, dry, and crumbles easily. When squeezed, the particles do not stick together.

Characteristic plants:
poppy, oxeye daisy, carnation, wormwood, red clover, and sandwort.

Best vegetables:
carrots, onions, and zucchini.

Loamy soil

Loamy soil is rich in nutrients, warm, well-aerated, and retains water efficiently, making it ideal for most vegetables and garden plants.

How to identify it?
Feels smooth and soft. When rolled into a sausage shape, it glistens but falls apart.

Characteristic plants:
dandelion, chamomile, buttercup, thistle, sunflowers.

Best vegetables:
tomato, potato, bean.

Clay soil

Clay soil is dense and sticky, capable of holding large amounts of water but with poor air circulation. Although it is challenging to cultivate, it is highly nutrient-rich and suitable for many plants if properly aerated (by turning or plowing in autumn) and enriched with organic matter.

How to identify it?
Feels sticky and soft to the touch. A small piece of soil can be rolled into a smooth ball that holds its shape.

Characteristic plants:
dandelion, comfrey, plantain, field mint, nettle.

Best vegetables:
lettuce, broccoli, kale.

Silty soil

Silty soil consists of very fine particles, making drainage difficult, which often leads to compaction and excessive water retention. When wet, it becomes sticky, and when dry, it can collapse into airless layers. To improve its structure, regular tilling and adding organic matter are essential.

How to identify it?
When wet, it feels sticky and can be shaped into a soft ball, though less compact than clay. When dry, it crumbles into very fine particles.

Characteristic plants:
willow, poplar, alder, water lily, marsh horsetail.

Best vegetables:
cucumber, chard, cabbage.

Peaty soil

Peaty soil is rich in organic matter but is often acidic, making it less suitable for plants that require neutral soil conditions. It requires frequent fertilization to improve its nutrient content.

How to identify it?
When moist, it feels soft, wet, and slightly sticky.
When dry, it becomes light, loose, and powdery.
If you squeeze a handful, it crumbles easily.

Characteristic plants:
blueberries, red clover, rusty-leaved rhododendron, moss, peat grass.

Best vegetables:
beetroot, blueberries, kohlrabi.

Teachers should explain how different soil types influence plant growth and show students simple ways to recognize soil, like feeling its texture or observing which plants grow in it naturally.

3.2

Removing weeds and larger objects

BEFORE DIGGING OR TURNING THE SOIL, MAKE SURE TO REMOVE STONES, ROOTS, AND WEEDS.

Assign roles to students to make the clearing process more effective and engaging. Younger students can wear gloves and remove weeds by hand. Older students can use small gardening tools to assist with weeding. Another group can collect stones, branches, and other objects that may hinder plant growth. Ensure that all trash is properly disposed of, and remind students to clean up carefully, placing waste into designated bins.

3.3

Loosening the soil

After removing weeds and obstacles, loosen the soil to improve air circulation and nutrient absorption. Students can participate using small gardening tools to gently break up the soil. Well-aerated soil allows roots to access oxygen, promoting healthier plant growth. If the soil is too compacted, roots struggle to grow and absorb nutrients, hindering plant development.

3.3.1

Using mulch

MULCHING IS A NATURAL GARDENING TECHNIQUE THAT IMITATES NATURAL PROCESSES, WHERE SOIL IS ALMOST NEVER BARE. IN NATURE, DEAD PLANT MATTER TYPICALLY STAYS ON THE GROUND, PROTECTING THE SOIL AND FEEDING SOIL ORGANISMS.

Cover the soil with a layer of organic mulch, such as straw, leaves, grass clippings, or compost. It is important to apply a thick enough layer to effectively protect the soil from drying out, prevent nutrient loss, and suppress weed growth. Mulching offers multiple benefits: retains soil moisture and prevents hard crust formation; regulates soil temperature, keeping it stable, provides nutrients for microorganisms, improving soil fertility. reduces weed growth and enhances plant resistance by fostering a healthy soil ecosystem.

3.4

Adding organic matter

It is recommended to enhance the soil with organic materials such as compost, fallen leaves, or straw. Adding these materials improves soil structure and boosts fertility by providing essential nutrients. Teachers can use this opportunity to explain to students the natural cycle of nutrients in nature.

Soil preparation is not just a technical process but also an essential part of environmental education. Through hands-on gardening, students learn about natural processes, such as organic matter decomposition and the nutrient cycle in soil.

SOIL PREPARATION TEACHES STUDENTS RESPONSIBILITY TOWARD NATURE AND ENCOURAGES A SUSTAINABLE MINDSET. THEY LEARN THAT SOIL IS NOT JUST A BASE FOR PLANTS BUT A LIVING ECOSYSTEM, FULL OF MICROORGANISMS THAT BREAK DOWN ORGANIC MATTER AND CREATE ESSENTIAL NUTRIENTS. BY ENRICHING THE SOIL WITH COMPOST AND MULCH, STUDENTS LEARN HOW TO REDUCE DEPENDENCE ON CHEMICAL FERTILIZERS AND PESTICIDES WHILE MAINTAINING SOIL FERTILITY OVER TIME.

CHAPTER 4

Compost

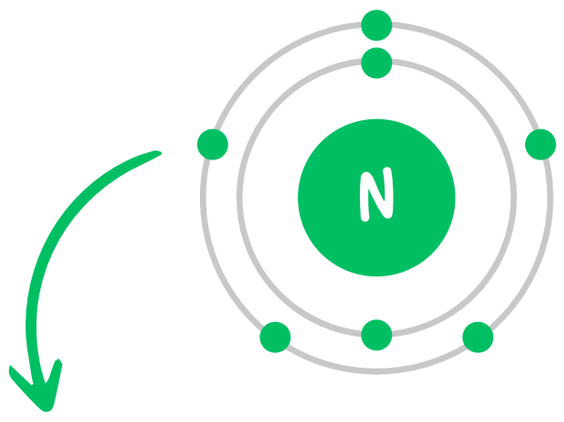
Compost is a rich natural fertilizer created through the slow breakdown of organic materials like plant debris, kitchen waste, and garden scraps. It is a nutrient-rich substance containing essential elements for healthy plant growth, including nitrogen, phosphorus, potassium, and various micronutrients. Using compost in the garden improves soil structure, enhances water retention, and enriches the soil with nutrients that plants need for optimal growth and development.

Compost is not just a fertilizer–it is also a powerful soil improver, promoting the activity of microorganisms and earthworms, which are essential for maintaining a healthy soil ecosystem. Composting allows organic matter to circulate within the garden and school, reducing waste and contributing to sustainable resource management.

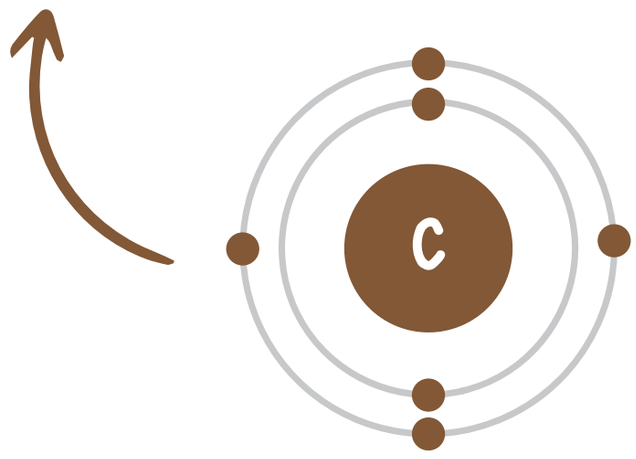
THROUGH COMPOSTING, STUDENTS LEARN HOW ORGANIC WASTE CAN BE TRANSFORMED INTO A VALUABLE RESOURCE THAT SUPPORTS SUCCESSFUL GARDENING AND SUSTAINABLE PRACTICES. COMPOSTING IN THE SCHOOL GARDEN IS NOT ONLY A PRACTICAL WASTE MANAGEMENT METHOD BUT ALSO AN IMPORTANT EDUCATIONAL TOOL FOR FOSTERING ECOLOGICAL AWARENESS AMONG YOUNG PEOPLE.

4.1

Composting



Composting is based on alternating layers of two types of organic matter: green and brown materials. **Green materials** are rich in nitrogen (fruit and vegetable scraps, grass clippings, kitchen waste, eggshells, plant debris). **Brown materials** are high in carbon (dry leaves, twigs, sawdust, coffee grounds, straw, hay, dust). This combination ensures efficient decomposition, as microorganisms require a balanced intake of both elements to function properly.



4.2

Compost bin and compost pile

Choosing the right location in the school garden is crucial when setting up a compost bin. The best spot is shady and well-ventilated, preventing the compost from drying out while ensuring adequate airflow, as microorganisms need oxygen for decomposition. A good location is under a tree or near bushes that provide natural shade. It is also important to place the compost bin on slightly moist but well-draining soil, preventing excess water from accumulating and ensuring proper composting conditions.

YOU CAN BUILD A COMPOST BIN USING WOODEN PALLETS, AS THEY ALLOW AIR CIRCULATION, WHICH IS ESSENTIAL FOR EFFECTIVE DECOMPOSITION.

The gaps between the wooden slats should be wide enough for proper ventilation but not too large to prevent compost from spilling out. The compost pile should be about 1.5 meters high to retain enough heat for efficient decomposition. The width can be adjusted based on the available space in the school garden.

It is recommended to place a layer of coarse materials, such as twigs or corn stalks, at the bottom of the compost bin to aid drainage and improve aeration. Then, alternate green (nitrogen-rich) and brown (carbon-rich) layers, each about 20 cm thick. Regularly turning the pile ensures oxygen flow and prevents unpleasant odors. To prevent drying out, cover the compost with a breathable fabric that shields it from rain while retaining moisture. If the compost becomes too dry, occasionally water it to maintain the proper moisture level.

WITH PROPER SETUP AND REGULAR MAINTENANCE, STUDENTS CAN EASILY FOLLOW THE COMPOSTING PROCESS AND CREATE HIGH-QUALITY COMPOST RICH IN NUTRIENTS.

4.3

The influence of air, moisture and heat

For successful composting, regular aeration of the compost pile is essential, as microorganisms require oxygen to function. A lack of oxygen leads to rotting, so the pile should be turned at least once a month. Maintaining consistent moisture is equally important–compost should be as damp as a wrung-out sponge. During hot summer months, water can evaporate quickly, so occasional watering may be necessary to prevent the compost from drying out and to keep the decomposition process active.

4.4

What belongs in the compost?

Almost all organic materials can be added to compost: vegetable and fruit peels, eggshells, grass clippings, dry leaves, coffee grounds, and tea waste. You can also add wood shavings, cardboard, and paper without colored inks. It is essential that the materials do not contain plastic or other harmful substances to ensure safe and effective composting.

4.5

What does not belong in the compost?

Avoid adding animal waste, fat, plastic, glass, bones, diseased plants, pet droppings, and tough materials. These substances can slow down the composting process or even cause unpleasant odors.

4.6

Accelerating decomposition

You can accelerate composting by regularly turning the pile and adding water if the compost is too dry. There are also natural methods to speed up the process, such as preparing a herbal mix (chamomile, nettle, yarrow) that encourages faster decomposition of materials. Another way to speed things up is using active microorganisms.

4.7

Using compost

When the compost is ready (usually after 4–6 months), you can recognize it by its crumbly texture, dark brown color, and a pleasant earthy smell. After that, you can use the compost in the school garden to fertilize vegetable beds and ornamental plants.

COMPOST IMPROVES SOIL STRUCTURE, INCREASES WATER RETENTION, AND ENRICHES THE SOIL WITH NUTRIENTS, CONTRIBUTING TO THE HEALTHY GROWTH OF PLANTS.

4.8

Vermicomposting

Vermicomposting is another efficient method that uses earthworms to accelerate the breakdown of organic matter. By using California red worms, high-quality fertilizer can be produced in a shorter time. The worms feed on plant residues, breaking down organic matter into humus.

THIS CHAPTER OFFERS BASIC GUIDANCE FOR STARTING COMPOSTING IN AN URBAN SCHOOL GARDEN. COMPOSTING IS NOT JUST THE PROCESS OF PROCESSING ORGANIC MATERIALS, BUT ALSO AN EDUCATIONAL OPPORTUNITY FOR STUDENTS TO LEARN THE IMPORTANCE OF SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES AND CONTRIBUTE TO ENVIRONMENTAL CARE.

Appendix 2:

Picture cards of items that belong or do not belong in the compost

CHAPTER 5

Manure and fertilizers

To support healthy plant growth, key nutrients in the soil must be regularly renewed through proper fertilization. Healthy soil is the foundation for healthy plants, so it is important to provide them with the right nutrition through fertilizers. Fertilizing is not only important for adding nutrients but also for improving soil structure and ensuring long-term fertility.

5.1

Essential nutrients for plants

PLANTS NEED THREE PRIMARY NUTRIENTS FOR HEALTHY GROWTH:

1. **Nitrogen (N):** Crucial for the growth of stems and leaves, as well as for photosynthesis.

2. **Phosphorus (P):** Helps with root development, flowering, and fruit ripening.

3. **Potassium (K):** Contributes to root development, disease resistance, and overall plant growth.

A DEFICIENCY OF THE MENTIONED NUTRIENTS CAN SERIOUSLY AFFECT PLANT GROWTH. IN ADDITION TO THESE PRIMARY NUTRIENTS, PLANTS ALSO REQUIRE MICRONUTRIENTS, WHICH, ALTHOUGH NEEDED IN SMALLER AMOUNTS, ARE ESSENTIAL FOR PLANT HEALTH AND PRODUCTIVITY.

5.1.1

Micronutrients and their role

1. **Iron (Fe):** A deficiency causes yellowing of leaves (chlorosis) and disrupts fruit growth. Adding iron is often necessary due to excess phosphorus in the soil or high lime content.

2. **Copper (Cu):** A deficiency of copper leads to drying and falling off of leaves. The use of copper is particularly important for plants that require larger amounts of this element.

3. **Boron (B):** A deficiency of boron results in deformed leaves and rotting in beetroot. Boron is essential for the growth and development of flowers and fruits.

4. **Molybdenum (Mo):** It is essential for nitrogen fixation in plants from the legume family, which contributes to better utilization of nutrients from the air.

5.2

Types of fertilizers

Fertilizers play a key role in plant growth and development by providing essential nutrients to the soil. There are different types of fertilizers, which vary in composition, action, and effects on the soil. Fertilizers are divided into organic and inorganic, with each type offering its own advantages and challenges.

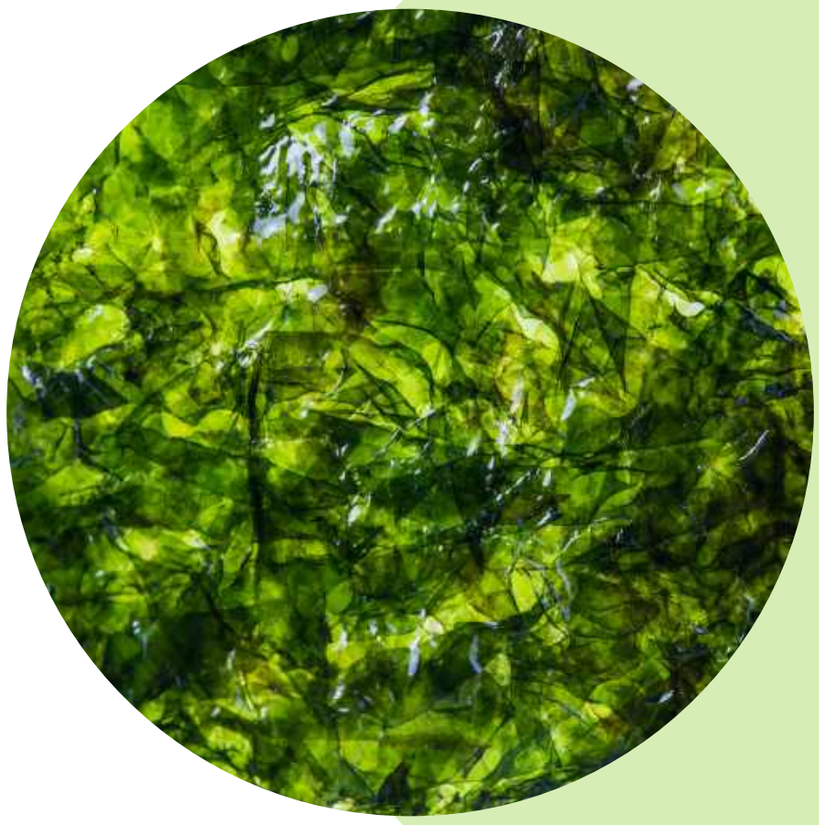
5.2.1

Organic fertilizers

Organic fertilizers are natural fertilizers that are formed through the decomposition of organic matter and contain essential nutrients for plants. Their advantage is that they improve soil structure, increase humus content, and stimulate the activity of soil microorganisms. Examples include compost, manure, dead plants, and algae.

Manure: It is one of the oldest and most commonly used organic fertilizers. Rich in nitrogen, phosphorus, and potassium, it is excellent for improving soil fertility. Manure works slowly but long-term, as nutrients are released gradually as it decomposes in the soil. It is recommended to use it before the growing season to enrich the soil with organic matter, enabling better plant growth throughout the year.

Green manure: It is a process in which you sow plants that are later incorporated into the soil. Plants such as clover, peas, and mustard are rich in nitrogen and other nutrients, which are released into the soil as they decompose. Green manure not only adds nutrients to the soil but also improves soil structure and increases its water retention capacity. Additionally, it helps reduce weed growth and, in the long term, improves soil fertility.



Seaweed: It is a highly nutritious organic fertilizer rich in minerals and micronutrients like magnesium, calcium, potassium, and iron. Due to its composition, seaweed is excellent for improving soil structure and promoting plant growth. It can be used in the form of powder or as a liquid fertilizer. Seaweed works quickly and effectively, helping plants increase resistance to stress conditions, such as diseases and drought.

5.2.2

Inorganic fertilizers

Inorganic fertilizers are obtained through industrial processes and contain mineral nutrients that are immediately available to plants. Due to their fast action, inorganic fertilizers are often used for instant plant growth improvement, but they do not contribute to the long-term improvement of soil structure.

Rock and basalt powders: These are natural sources of phosphorus, potassium, and other micronutrients. They are used to improve soil fertility and increase plant resistance. Their advantage is that they release nutrients slowly, allowing for long-term fertilization without the risk of nutrient leaching.

INORGANIC FERTILIZERS WORK QUICKLY, BUT THEY MUST BE USED CAUTIOUSLY, AS EXCESSIVE USE CAN LEAD TO SOIL ACIDIFICATION OR OTHER ECOSYSTEM ISSUES.

5.2.3

Natural fertilizers from local sources

CREATING NATURAL FERTILIZERS FROM LOCAL SOURCES IS A GREAT OPPORTUNITY TO ENGAGE STUDENTS IN MAKING ECO-FRIENDLY AND LOW-COST PLANT NUTRIENTS. THE INGREDIENTS FOR THESE FERTILIZERS CAN BE FOUND AROUND THE SCHOOL OR HOME, AND THEIR USE REDUCES THE NEED FOR SYNTHETIC FERTILIZERS.

Green tea: It is a gentle source of natural fertilizer, rich in antioxidants and minerals, which helps plants strengthen their roots and improve overall health.

INSTRUCTIONS FOR USE:
SOAK ONE GREEN TEA BAG IN 4 LITERS OF WATER AND USE THIS LIQUID TO WATER THE PLANTS ONCE EVERY FOUR WEEKS. IT IS ESPECIALLY SUITABLE FOR INDOOR PLANTS AND YOUNG GARDEN PLANTS.

Gelatin: It is an excellent source of nitrogen, which is crucial for leaf and stem growth. However, be cautious, as some plants do not tolerate high nitrogen concentrations.

INSTRUCTIONS FOR USE:
DISSOLVE ONE PACKET OF GELATIN IN A CUP OF HOT WATER, THEN ADD THREE CUPS OF COLD WATER. USE THIS MIXTURE TO WATER THE PLANTS ONCE A MONTH, ESPECIALLY THOSE THAT REQUIRE MORE NITROGEN, SUCH AS LEAFY VEGETABLES.

Aquarium water: It is rich in organic matter such as nitrates and phosphates, which are excellent for plant growth. This natural fertilizer helps improve soil fertility without the risk of over-fertilization.

INSTRUCTIONS FOR USE:
WHEN CLEANING THE AQUARIUM, USE THE EXCESS WATER TO WATER INDOOR OR GARDEN PLANTS.

Wood ash: It is rich in potassium, phosphorus, and calcium, making it ideal for fertilizing plants that require alkaline soils. It also helps to improve acidic soils.

INSTRUCTIONS FOR USE:

MIX THE ASH EVENLY INTO THE SOIL BEFORE PLANTING OR SPRINKLE IT OVER PLANTING FURROWS AND HOLES. IT IS SUITABLE FOR CABBAGE FAMILY PLANTS, ROOT VEGETABLES, FRUIT TREES, BERRIES, AND VINES. BE CAUTIOUS WITH PLANTS THAT REQUIRE ACIDIC SOILS, AS ASH HAS AN ALKALINE EFFECT.

Comfrey fertilizer: Comfrey is rich in potassium, calcium, and phosphorus, making it perfect for preparing liquid fertilizer. It is used for tomatoes, zucchini, and other fruiting plants, and also acts as a compost activator.

INSTRUCTIONS FOR USE:

CUT ABOUT 20 CM LONG COMFREY STEMS AND PLACE THEM INTO TWO-LITER PLASTIC BOTTLES. FILL THE BOTTLES WITH WATER, LEAVING 2 CM FROM THE TOP, CLOSE THE BOTTLES, AND SHAKE THEM WELL. LET THE FERTILIZER SIT FOR A MONTH, THEN STRAIN THE LIQUID AND DILUTE IT WITH WATER IN A 1:10 RATIO. USE IT TO WATER TOMATOES, ZUCCHINI, AND OTHER VEGETABLES.

Dandelion tea: Dandelion is rich in vitamins and minerals, making it excellent for preparing a natural tea to boost plant health. Dandelion tea improves fruit quality and strengthens plant resistance.

INSTRUCTIONS FOR USE:

POUR 40 G OF FRESH DANDELION LEAVES AND FLOWERS WITH 2 LITERS OF BOILING WATER. LET THE TEA SIT UNTIL THE LIQUID COOLS, THEN STRAIN IT AND USE THE TEA TO SPRAY THE PLANT LEAVES TO BOOST GROWTH AND INCREASE YIELD.

Weeds as fertilizer: Weeds are rich in minerals that they absorb from the deeper layers of the soil. You can use them to prepare a strong natural fertilizer.

INSTRUCTIONS FOR USE:

CHOP THE WEEDS INTO SMALLER PIECES AND COVER THEM WITH RAINWATER OR STALE WATER IN A RATIO OF 1 KG OF PLANTS TO 10 LITERS OF WATER. LET THE MIXTURE FERMENT, STIRRING IT EVERY DAY. ONCE THE LIQUID STOPS FOAMING, DILUTE IT IN A 1:10 RATIO WITH WATER AND USE IT TO WATER THE PLANTS.

Involving students in the fertilization process of the urban school garden is crucial, as it provides them with **hands-on learning about natural processes**. This helps them gain a deeper understanding of how soil nutrients affect plant growth. Participating in fertilization fosters a sense of responsibility and awareness that their care for the soil directly impacts the success of the harvest. Students learn sustainable gardening practices and **how to make natural fertilizers** from local sources, which increases their environmental awareness and encourages responsible management of natural resources. Furthermore, fertilizing the school garden encourages students to collaborate and **work as a team**, as they need to coordinate tasks, enhancing their social skills. Preparing natural fertilizers, such as those made from weeds or comfrey, **stimulates creativity and innovative thinking** about the use of natural materials.

Students gain valuable experiences that will benefit them in everyday life and contribute to the development of healthy and environmentally responsible values.

CHAPTER 6

Crop rotation

Crop rotation is a method of systematically changing plant species on garden beds over several years, which improves soil quality, prevents diseases, reduces pests, and increases yields. Each plant species has unique nutrient needs and affects the soil differently.

If you plant the same crops in the same bed for several consecutive years, nutrients get depleted, the soil becomes less fertile, and the risk of diseases increases. Crop rotation helps maintain soil fertility, as different plant species take up different nutrients from the soil, while some, like legumes, enrich the soil with nitrogen.

THIS IS ALSO A GREAT OPPORTUNITY TO TEACH STUDENTS THE BASICS OF ORGANIC GARDENING, SOIL CARE, AND THOUGHTFUL PLANNING.

6.1

Basic principles of crop rotation

WHEN PRACTICING CROP ROTATION, CONSIDER THE FOLLOWING GUIDELINES:

1. Nutrient requirements:

Different plant species have varying nutrient needs. Based on this, they are divided into four groups.

NUTRIENT REQUIREMENTS	VEGETABLE
VERY HIGH	**Cruciferous vegetables:** broccoli, cauliflower, kohlrabi, kale, cabbage
HIGH	**Squash family:** cucumbers, zucchini, melons, watermelons **Carrot family:** parsnip, celery **Legumes:** pole beans **Nightshades:** tomatoes, peppers, eggplant, potatoes
MEDIUM	**Carrot family:** carrot, sweet fennel **Cruciferous vegetables:** black radish, kohlrabi, Chinese cabbage, turnip

MEDIUM	**Goosefoot family:** chard, beetroot **Onion family:** onion, garlic, leek **Dandelion family:** endive, chicory, lettuce **Spinach family:** corn salad
LOW	**Cruciferous vegetables:** asian leafy vegetables, cress, radish, arugula **Carrot family:** parsley **Goosefoot family:** spinach **Legumes:** broad beans, chickpeas, peas, bush beans

Source: Jerneja Jošar, Ecological Gardening for Everyone, p. 58.

2. Plant requirements for soil acidity:

Most vegetables thrive in slightly acidic soils, where the pH values range from 5.6 to 6.7. When planning crop rotation, consider the soil acidity and arrange plants according to the environment that suits them. For example, fruiting plants perform best in more acidic soils, while root vegetables, tubers, and onions prefer alkaline soils. If necessary, you can adjust the soil's pH by adding lime or organic fertilizer beforehand.

You can measure the pH of garden soil with students. For this measurement, you will need a glass, a teaspoon, water, garden soil, and a pH test strip. Tell the students that the pH test strips show the pH level, and explain that soil is acidic when it is low in lime or contains none, and alkaline when it contains a lot of lime.

Measurement procedure: Place 2 teaspoons of garden soil in a glass and add 0.3 dl of water, then mix. Let the mixture sit for an hour, occasionally stirring. Dip the pH test strip into the liquid, leaving it for a few seconds (make sure the strip does not touch the soil, it should only be immersed in the liquid). The strip will change color depending on the pH level of the liquid. Compare the color of the test strip with the accompanying color chart and read the pH value.

You can also use a **digital pH meter**, which is more accurate, or a **soil analysis kit** with quick methods to measure soil parameters, including nitrogen, phosphorus, and potassium levels, in addition to pH.

3. Botanical families:

Plants that belong to the same botanical family often absorb the same nutrients and are susceptible to the same diseases. Therefore, avoid planting them consecutively in the same garden bed. For example, if you have grown cucumbers in a bed, do not plant cucumbers or other plants from the same botanical family in that bed for at least a few years.

BOTANICAL FAMILY	VEGETABLE
SQUASH F.:	zucchini, pumpkins, cucumbers, watermelons, melons
CARROT F.:	carrot, parsnip, parsley, sweet fennel, celery
CRUCIFEROUS VEGETABLES:	asian leafy vegetables, broccoli, cauliflower, black radish, kohlrabi, kohlrabi greens, kale, radish, turnip, cabbage
ONION F.:	onion, garlic, chives, leek, shallot
GOOSEFOOT F.:	chard, beetroot, spinach
LEGUMES:	broad beans, chickpeas, beans, peas, lentils, soybeans
DANDELION F.:	artichoke, black salsify, endive, chicory, lettuce
NIGHTSHADES:	peppers, eggplant, potatoes, tomatoes
MALLOW F.:	sweet potato
SPINACH F.:	corn salad

Source: Jerneja Jošar, Ecological Gardening for Everyone, p. 60.

4. Root depth:

Plants have different root depths, which affects how they utilize nutrients from various soil layers. Plants with shallow roots, such as lettuce and spinach, draw nutrients from the upper soil layers, while plants with deep roots, such as carrots and potatoes, access deeper layers. Planning crop rotation based on root depth helps to utilize soil nutrients more evenly.

ROOT DEPTH	VEGETABLE
SHALLOW ROOTS	endive, eggplant, cucumbers, watermelons, melons, corn salad, peppers, parsley (for leaves), chicory, lettuce, spinach
MEDIUM-DEEP ROOTS:	chard, broad beans, broccoli, cauliflower, chickpeas, beans, peas, kale, cabbage
DEEP ROOTS:	carrots, potatoes, parsnips, parsley (for root), celery

Source: Jerneja Jošar, Ecological Gardening for Everyone, p. 60.

Worksheet for monitoring soil pH and temperature measurements:

Among the appendices, you will find a worksheet that allows students to monitor and record data on soil pH and temperature at depths of 5 and 10 cm. Through this activity, students will gain hands-on experience with measurement and data analysis, and observe the relationship between air temperature and soil temperature. Students should also note any special weather conditions, such as heavy rainfall or extremely dry weather, and monitor how these conditions affect soil pH and temperature, as well as plant growth.

Teachers are encouraged to facilitate discussions among students about their findings, comparisons between results, and exploration of external factors that influence plant growth. The purpose of this worksheet is to stimulate students' curiosity and critical thinking about the impact of the environment on plant growth and development. It is recommended that measurements be taken every two weeks (twice a month), though more frequent observations are also welcome.

Appendix 3:

Worksheet: Soil pH and temperature

6.2

Crop rotation planning

WE RECOMMEND THAT TEACHERS, TOGETHER WITH STUDENTS, CREATE A SIMPLE CROP ROTATION PLAN LASTING THREE TO FOUR YEARS. THIS WAY, STUDENTS WILL LEARN THE IMPORTANCE OF PLANNING, DIVIDING PLANTS BASED ON THEIR NUTRIENT NEEDS, AND ADJUSTING THE SOIL ACCORDING TO THE REQUIREMENTS OF DIFFERENT PLANT SPECIES.

YEAR	FIRST	SECOND	THIRD	FOURTH	FIFTH
1. BED	broccoli, cauliflower, kale, cabbage	zucchini, cucumbers, peppers, tomatoes	onion, carrot, leek, beetroot	broad beans, chickpeas, peas, bush beans	broccoli, cauliflower, kale, cabbage
2. BED	zucchini, cucumbers, peppers, tomatoes	onion, carrot, leek, beetroot	broad beans, chickpeas, peas, bush beans	broccoli, cauliflower, kale, cabbage	zucchini, cucumbers, peppers, tomatoes
3. BED	onion, carrot, leek, beetroot	broad beans, chickpeas, peas, bush beans	broccoli, cauliflower, kale, cabbage	zucchini, cucumbers, peppers, tomatoes	onion, carrot, leek, beetroot
4. BED	broad beans, chickpeas, peas, bush beans	broccoli, cauliflower, kale, cabbage	zucchini, cucumbers, peppers, tomatoes	onion, carrot, leek, beetroot	broad beans, chickpeas, peas, bush beans

Source: Jerneja Jošar, Ecological Gardening for Everyone, p. 60.

Crop rotation is an excellent way to teach students about sustainable management of natural resources, while also actively involving them in the processes of planning, caring for the soil, and long-term food production.

CHAPTER 7

Intercropping

Intercropping is a gardening method in which different plant species grow together in the same bed, creating a favorable environment for their growth, reducing the risk of diseases, and preventing pest infestations. It is important to arrange the plants according to how well they interact with each other and avoid monocultures, where all the plants are of the same species.

ADVANTAGES OF INTERCROPPING:

Better resistance to diseases and pests:

Some plants, such as onions, repel pests with their scents, such as the carrot fly, which attacks carrots.

Promoting growth:

Some plants have a positive effect on each other's growth. For example, basil encourages the growth of tomatoes, and legumes such as beans enrich the soil with nitrogen, which benefits cucumbers.

Reducing disease spread:

Pests and diseases are less likely to spread if plants susceptible to the same diseases are not planted together.

Better space utilization:

By mixing slow-growing and fast-growing plants, you can make better use of garden space. For example, early lettuce can be planted alongside peppers, which take longer to grow.

When practicing intercropping, also consider the final size of the plants and the rate of their growth, as this will help you in planning and more efficiently growing food in a small space.

ENGAGE STUDENTS IN PLANNING INTERCROPPING AND ALLOW THEM TO RESEARCH COMPATIBLE AND INCOMPATIBLE PLANT COMBINATIONS. BASED ON SCHOOL GARDEN CROPS, THEY CAN CREATE NEIGHBOR SCHEMES AND EXPLORE HOW COMBINATIONS AFFECT PLANT HEALTH AND GROWTH.

WE HAVE PREPARED A UNIVERSAL SCHEME OF GOOD AND BAD NEIGHBORS THAT YOU CAN USE TO EXPLAIN THE INTERCROPPING METHOD.

VEGETABLE	GOOD NEIGHBORS	BAD NEIGHBORS
CHARD	bush beans, radishes, cabbage family, carrots, lettuce	beetroot, spinach
BROCCOLI	chard, broad beans, peas, lettuce, potatoes, beans	carrots, radishes, tomatoes
BRUSSELS SPROUTS	beans, peas, lettuce, Swiss chard, potatoes	onions, radishes, tomatoes
ZUCCHINI	onions, beans, tomatoes, spinach, basil	cucumbers, potatoes
CAULIFLOWER	celery, tomatoes, bush beans, chard	onions, kohlrabi
ONION	zucchini, lettuce, chicory, beetroot, cucumbers, tomatoes, carrots	peas, beans, cabbage family, leek, spinach
GARLIC	tomatoes, cucumbers, beetroot, carrots	beans, peas, cabbage family
ENDIVE	leek, beans, peas, cabbage family, spinach, tomatoes, radishes	chicory
BEANS	potatoes, cucumbers, tomatoes, radishes, cabbage family, sage, lettuce	onions, garlic, leek, carrots, peppers, peas
PEAS	celery, lettuce, carrots, cabbage family, cucumbers, zucchini, beetroot	peppers, tomatoes, onions, garlic, leeks, beans
HORSERADISH	cucumbers, potatoes, cabbage, spinach	peas, beans, garlic, onions
CHINESE CABBAGE	beans, peas, lettuce, carrots, spinach	radish, daikon radish, onions, garlic
KOHLRABI	lettuce, peas, beans, celery, beetroot, potatoes, cucumbers, onions	sweet fennel, tomatoes, spinach, radish
CARROT	onions, leeks, tomatoes, radishes, lettuce, spinach	parsley, beetroot, fennel, celery

VEGETABLE	GOOD NEIGHBORS	BAD NEIGHBORS
POTATOES	spinach, horseradish, parsnip, beans, peas, parsley	zucchini, tomatoes, cucumbers, onions
CUCUMBERS	onions, lettuce, beans, peas, broccoli, celery	potatoes, tomatoes, radishes
CORN SALAD	cucumbers, peppers, tomatoes, spinach, onions	valerian
KALE	potatoes, spinach, lettuce, celery, cumin	onions, other cruciferous vegetables
PEPPERS	kohlrabi, lettuce, chives, cucumbers, garlic	beans, peas, potatoes, cabbage
TOMATOES	kohlrabi, lettuce, chives, cucumbers, garlic	beans, peas, potatoes, cabbage
PARSLEY	radish, tomatoes, cucumbers, garlic, potatoes	chicory, lettuce, carrot, celery
LEEK	tomatoes, lettuce, celery, endive, carrot	beans, peas, onions, garlic
CHICORY	tomatoes, carrots, beans, sage	parsley
BEETROOT	cucumbers, onions, garlic, cabbage, beans, lettuce	potatoes, spinach, leek, carrots
RADISH	beans, peas, carrots, chard, tomatoes, lettuce, parsley, spinach	cucumbers, onions, broccoli
SWEET FENNEL	cucumbers, lettuce, corn salad, zucchini, spinach	beans, tomatoes, parsley, cumin
LETTUCE	leek, onions, beans, peas, carrots, cucumbers, zucchini, tomatoes, beetroot, radishes	parsley, celery
ASPARAGUS	beans, peas, kohlrabi, cucumbers, lettuce, carrots	potatoes, garlic, leek, onions
SPINACH	beans, potatoes, tomatoes, cabbage family, cucumbers	beetroot, chard, onions
CABBAGE	celery, peas, beans, cucumbers, lettuce, spinach	onions, garlic, tomatoes, broccoli
CELERY	leek, beans, cabbage family, cucumbers, tomatoes	potatoes, parsley, endive

Source: Eco-Schools program Slovenia

CHAPTER 8

Weed control

When gardening in an urban school garden, it is important to teach students about sustainable methods that are friendly to nature and the environment. Weed control offers students hands-on experience with natural processes without the use of chemical herbicides.

8.1

Mulching

Mulching is a simple yet effective method of weed control. You can explain to students how mulch made from natural materials such as straw, hay, leaves, or compost covers the soil and prevents weeds from germinating by blocking access to sunlight. Together with the students, you can collect these natural materials and use them to cover the soil around the plants.

8.2

Manual weed removal

Manual weed removal is the most basic and direct method for controlling weeds. Explain that it's important to pull weeds out by the roots. This task provides a great opportunity for students to learn to recognize different types of weeds and develop a sense of responsibility for maintaining the school garden. It is best to remove weeds after rain or watering, when the soil is softer and the weeds are easier to pull out.

8.3

Use of hand tools

You can also develop gardening skills in students by using hand tools such as hoes, hand cultivators, or special tools for weed removal. You can explain to students how to use the tools properly and instruct them to be careful not to damage the soil or plants.

8.4

Shallow cultivation

Use a hoe to cultivate the soil about 2 cm deep to loosen the top layer of soil. This will cut through the weeds and aerate the soil.

8.5

Aged manure

Cover the soil with a layer of aged manure, which will prevent weed growth while also improving the soil.

8.6

Green manure and cover crops

Green manure is a natural method where you plant cover crops such as clover, mustard, or buckwheat, which prevent weed growth. These plants quickly cover the soil, add nutrients (mainly nitrogen) to the soil, and improve soil structure. Together with the students, you can sow cover crops, which are later incorporated into the soil to act as a natural fertilizer. This is an excellent way to teach the benefits of natural methods in gardening and sustainable farming.

8.7

Weeds as fertilizer

The weeds you remove can be used as a nutrient source for the school garden. Instead of discarding them, you can prepare a liquid fertilizer from the weeds, rich in minerals, together with the students. This process involves cutting the weeds into smaller pieces, covering them with water, and allowing them to ferment. Students can monitor this process and then use the liquid fertilizer for the plants in the garden.

ACTIVE PARTICIPATION IN WEED CONTROL ON THE SCHOOL GARDEN HELPS STUDENTS DEVELOP RESPONSIBILITY, PERSEVERANCE, AND PRACTICAL GARDENING KNOWLEDGE. STUDENTS GAIN KNOWLEDGE ABOUT PLANT IDENTIFICATION AND LEARN ECOLOGICAL WAYS TO CONTROL WEEDS WITHOUT THE USE OF CHEMICALS. AT THE SAME TIME, PHYSICAL WORK STRENGTHENS THEIR PHYSICAL AND MENTAL HEALTH, ENCOURAGING RESPECT FOR FOOD PRODUCTION.

CHAPTER 9

Plant protection

Plant protection is an important step in growing healthy vegetables and maintaining balance in the urban school garden. By learning about the most common pests, plant diseases, and external factors such as heat or excess moisture, students will be equipped with the knowledge needed for successful plant cultivation. They will discover how to protect crops using natural and sustainable methods.

9.1

Diseases

One of the challenges gardeners face is vegetable diseases. They often occur due to inappropriate growing conditions, which are not necessarily caused by the gardeners themselves but are also influenced by external factors such as excessive rainfall or drought. It is important to recognize vegetable diseases and take appropriate action when they occur.

Gray mold:

When/Where/Why does it appear?
In warm conditions.

What does it cause?
It covers the fruits, which then rot.

What to do?
Destroy the infected fruits.

Downy mildew:

When/Where/Why does it appear?
In warm, humid conditions.

What does it cause?
Brown spots appear on the leaves, along with whitish mold (on the underside).

What to do?
Destroy the infected parts of the plants.

Damping-off:

When/Where/Why does it appear?
When there is a disturbance in the oxygen supply to the roots (soil compaction).

What does it cause?
A fungal disease; brown spots appear on the root collar and roots, and the plants die.

What to do?
Increase air circulation, use clean pots, and tap water.

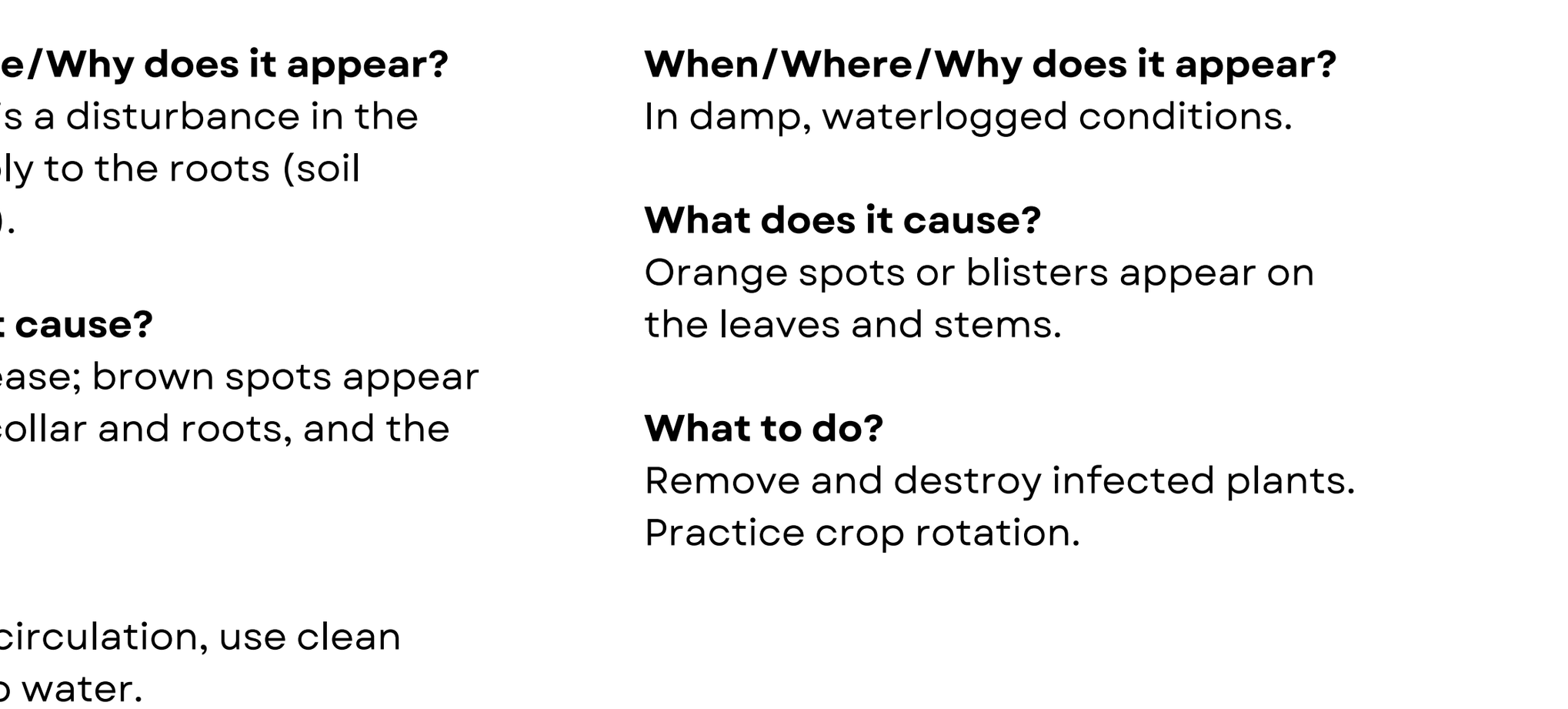
Rust:

When/Where/Why does it appear?
In damp, waterlogged conditions.

What does it cause?
Orange spots or blisters appear on the leaves and stems.

What to do?
Remove and destroy infected plants.
Practice crop rotation.

Teachers should encourage students to identify pests and disease symptoms, helping them develop observation and analytical skills.



Powdery mildew:

When/Where/Why does it appear?
In hot, dry conditions.

What does it cause?
White spots or powdery coating appear on leaves and shoots.

What to do?
Remove the affected parts (can be composted). Water the plants regularly.

Tomato (potato) blight:

When/Where/Why does it appear?
In warm, humid conditions.

What does it cause?
A fungal disease; the fruit rots, and brown spots appear on the stem and leaves.

What to do?
Remove and destroy the affected parts. Regularly remove suckers from tomatoes, mulch the soil under the plant. Practice crop rotation.

Fruit rot:

When/Where/Why does it appear?
Caused by calcium or potassium deficiency.

What does it cause?
It mainly affects peppers and tomatoes, causing the tips of the fruits to rot or preventing the fruit from ripening.

What to do?
Remove the infected fruits; if they are ripe enough, you can eat them (cut off the rotted part).

Cucumber mosaic:

When/Where/Why does it appear?
In humid conditions, where aphids are present, which transmit the virus.

What does it cause?
A viral disease that affects cucumbers and vegetables; slows plant growth and causes mottled or distorted leaves.

What to do?
Remove and destroy the infected plants.

ENCOURAGE STUDENTS TO OBSERVE PLANTS. THEY SHOULD NOTE HOW THE WEATHER AFFECTS PLANT GROWTH AND THE DEVELOPMENT OF POTENTIAL DISEASES. TOGETHER, EXPLORE WHICH MEASURES WOULD BE MOST EFFECTIVE IN PREVENTING THE SPREAD OF DISEASES.

9.2

Pests

PESTS ARE A COMMON CHALLENGE IN GARDENING AND CAN CAUSE EXTENSIVE DAMAGE TO PLANTS AND CROPS, AS THEY FEED ON PLANT JUICES, LEAVES, OR FRUITS, WHICH CAN WEAKEN OR EVEN DESTROY THE PLANTS. IT IS IMPORTANT FOR STUDENTS TO BECOME AWARE THAT PESTS ARE AN INTEGRAL PART OF ANY GARDEN. TEACHERS SHOULD TEACH STUDENTS TO RECOGNIZE THE SIGNS OF PEST ATTACKS AND INTRODUCE THEM TO NATURAL METHODS OF PROTECTION AGAINST PESTS.

Aphids:

Measures:

Remove aphids from affected plants by hand or by spraying with a strong stream of water. In the garden, plant as many plants as possible that attract natural aphid predators (ladybugs, hoverflies, lacewings, etc.) or plants that aphids dislike. Plant marigold, lavender, calendula, nasturtium, garlic, onions, radish, horseradish, savory, basil, mint, cumin, thyme.

Damage:

They tend to attack the young shoots of plants; they suck plant sap, causing leaves to curl and dry out, and plants become stunted.

Snails:

Measures:

Around plants, spread gravel, sand, mulch, bran, or set up physical barriers such as copper wires or gutters. Attract natural snail predators to the garden (hedgehogs, snakes, frogs, lizards, birds, ducks), place plant leaves around vegetables that snails dislike (elderberry, bracken, yarrow, horsetail, juniper), and plant plants that snails find unpleasant (nasturtium, marigold, California poppy, black nightshade, garlic, onions). You can also set out their favorite snacks (horseradish, apple, potato) in the evening and manually remove them in the morning. Use beer traps by pouring beer into a glass buried level with the soil – snails will crawl in and drown.

Damage:

They feed on all parts of the plant (leaves, stems, flowers, and fruits). If the plant is young, they may eat it entirely, while on larger plants, they leave behind large, irregular holes on the leaves and a slimy trail. They are most active early in the morning and in the evening.

COFFEE SOLUTION: DILUTE STRONG TURKISH COFFEE WITH WATER IN A 1:10 RATIO; SPRAY THE LIQUID ON THE AREAS WHERE THE SNAILS GATHER.

Caterpillars:

Measures:

With protective gloves, manually remove the caterpillars and eggs from the plants. Attract their natural predators, such as ladybugs, birds, and bats. Plant plants that caterpillars dislike (mint, basil, wormwood) in the garden.

Damage:

They feed on leaves, stems, flowers, and even fruits. If the plant is young, they can destroy the entire plant.

Colorado potato beetles:

Measures:

With protective gloves, remove the eggs, larvae, and beetles from the plants. Colorado potato beetles are a favorite food of chickens, frogs, birds, and ladybugs. Plant plants that beetles dislike (nasturtiums, marigolds, horseradish, mint, garlic, beans).

Damage:

They prefer potatoes, but they also enjoy eggplants and other solanaceous plants. Adult beetles and their very hungry larvae feed on the leaves of plants, leading to plant weakening and reduced yield.

Wireworms (larvae of click beetles):

Measures:

Till the soil to bring the larvae to the surface, where they will become food for birds. Create a trap by piercing pieces of carrot or potato onto nails and burying them 5-6 cm deep. Regularly check and replace the bait. Destroy the wireworms.

Damage:

They feed on the roots, tubers, and young plant stems underground. They prefer potatoes, carrots, lettuce, and corn. They make holes and "tunnels" in the tubers and roots, causing the plants to wither.

Voles:

Measures:

Encourage natural predators of voles to visit the garden, such as cats, hedgehogs, birds of prey, and snakes. Plant plants that voles dislike (e.g., clover, prickly pear, milkweed, daffodils, tulips). Push rags soaked in petroleum or fish oil, garlic, lemon, citronella, juniper branches into their tunnels. Plant elderberry branches in the garden, make elderberry brew (soak elderberry leaves in water for 10 days), and pour the strained liquid into the tunnels. Install simple noise deterrents like spinning windmills or buried glass bottles.

Damage:

Voles feed on the roots and tubers of various plants. They create tunnels underground, which can damage the root system of plants, causing poor growth or even plant death.

9.2.1

Natural predators of pests

Natural predators of pests are crucial for maintaining balance in the ecosystem of the school garden. Instead of controlling pests with chemical substances, you can effectively get rid of them by using natural predators. Their presence on the garden helps maintain a healthy environment and contributes to sustainable gardening and nature conservation.

Hedgehogs:

What do they eat:

Caterpillars, cockchafers, beetles, slugs, mice.

How to attract them:

They enjoy dense shrubbery. Have as many shrubs as possible in your garden. Provide them with a bowl of water.

Moles:

What do they eat:

Insect larvae, beetles, caterpillars, ants, centipedes.

How to attract them:

They prefer well-ventilated and moist soil. You can use the soil from molehills for composting or planting balcony flowers.

Lizards:

What do they eat:

Caterpillars, worms, grasshoppers, insects, snails.

How to attract them:

You can create a shelter for them in the form of a pile of stones.

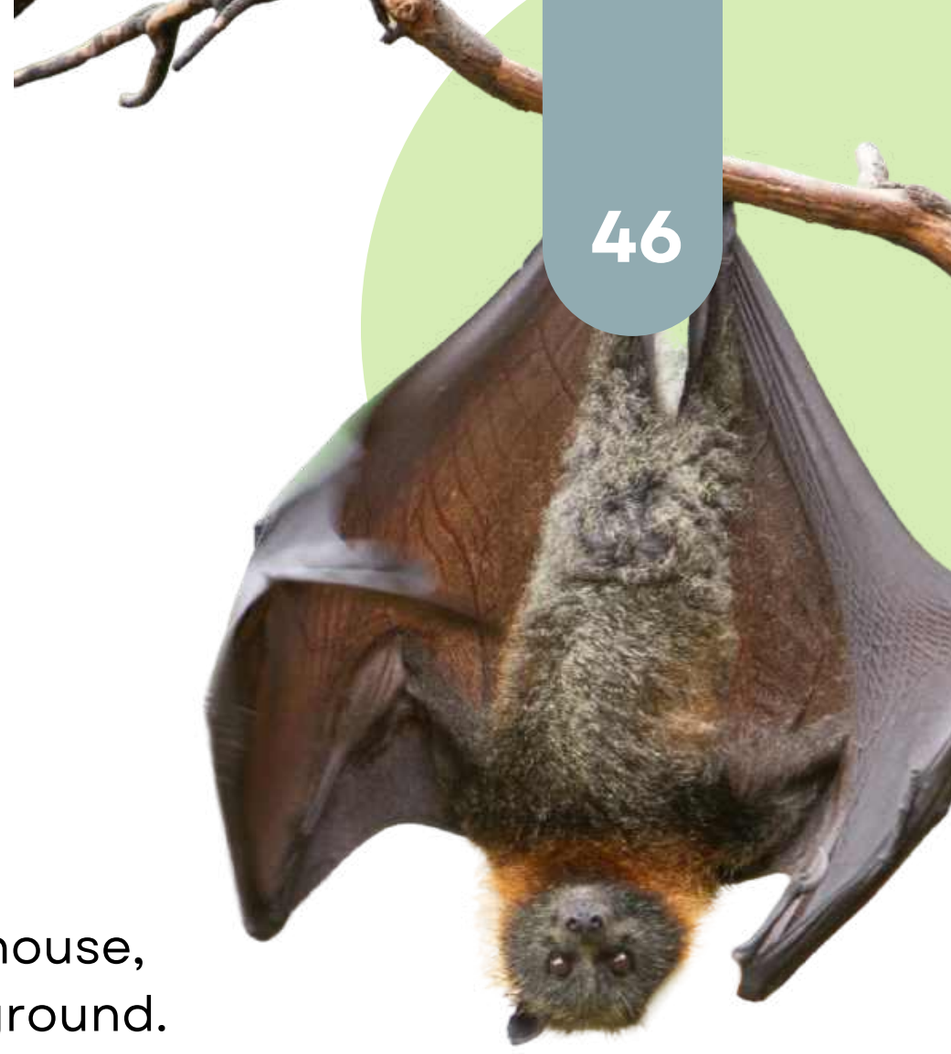
Bats:

What do they eat:

Caterpillars, apple and cherry fruit moths, beetles, mosquitoes.

How to attract them:

You can create a shelter for them in the form of a bat house, placing it in a sunny location at least 2 meters off the ground. The house should be closed on all sides except the bottom, which should have an entrance. The inside of the house should be rough or equipped with sticks to allow bats to cling to it.



Birds:

What do they eat:

Caterpillars, aphids, harmful insects.

How to attract them:

Place a birdhouse, feeder, and/or nesting box on the garden area, along with a water source (a shallow dish or clay container with water).

Ladybugs:

What do they eat:

Aphids, mites, scale insects, and other bugs. A single larva can eat up to 800 aphids in four weeks.

How to attract them:

Ensure there are plenty of wooden elements in the garden where they can overwinter.

Frogs and Toads:

What do they eat:

Ants, caterpillars, insects, snails.

How to attract them:

If possible, set up a pond on the school grounds.

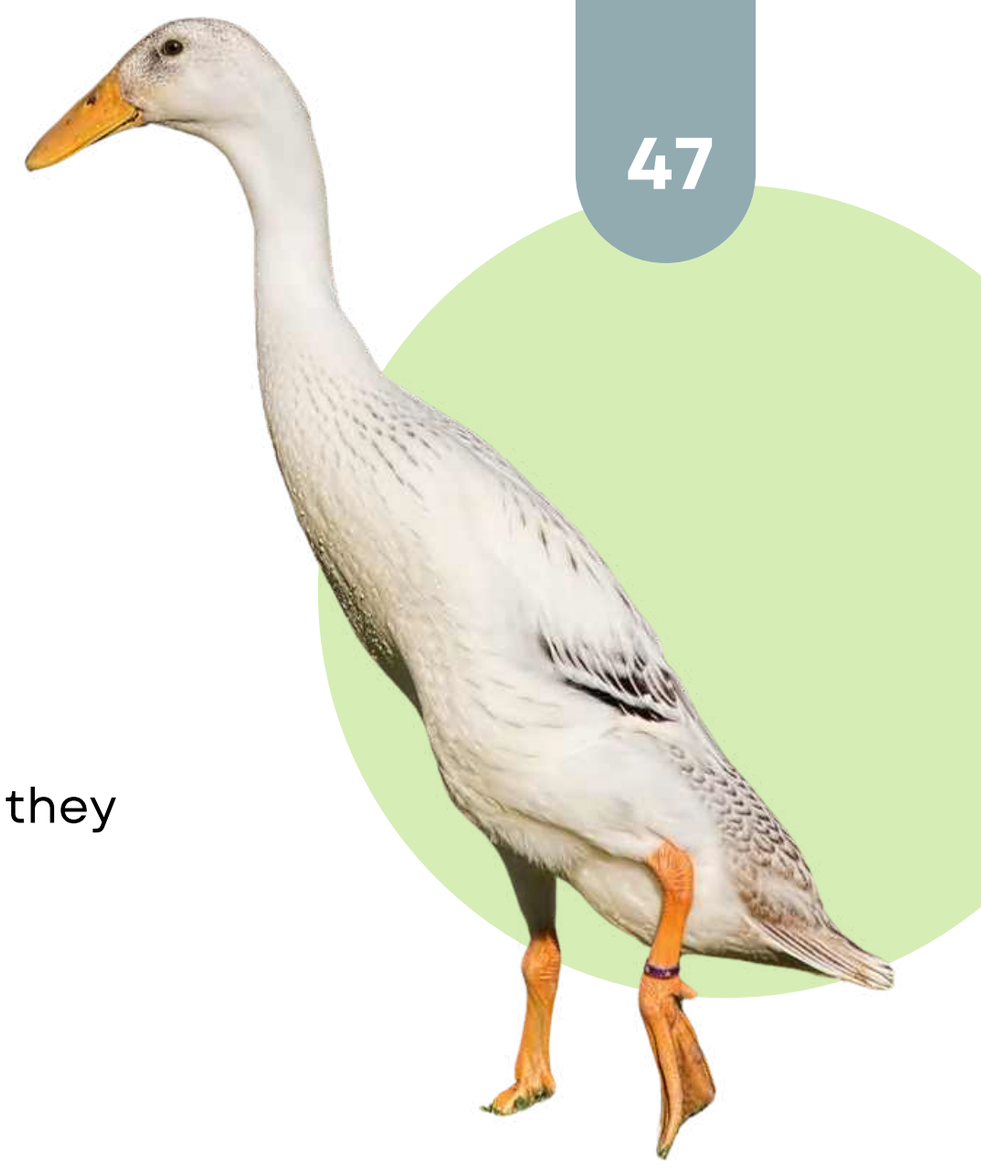
Indian Runner ducks:

What do they eat:

Red snails.

How to attract them:

If you have the opportunity, put them in your garden; they need space to move, access to water and shelter.



9.3

Protection from weather conditions

WEATHER CONDITIONS HAVE A SIGNIFICANT IMPACT ON THE GROWTH AND DEVELOPMENT OF CROPS, SO PROPER PROTECTION FROM WIND, HAIL, AND TEMPERATURE EXTREMES IS ONE OF THE KEY TASKS FOR ANY GARDENER. ON THE SCHOOL GARDEN, THIS IS IMPORTANT NOT ONLY FOR ENSURING A GOOD HARVEST BUT ALSO FOR THE EDUCATIONAL EXPERIENCE – STUDENTS LEARN RESPONSIBLE INTERACTION WITH NATURE AND THE FACTORS THAT INFLUENCE SUCCESSFUL FOOD PRODUCTION THROUGH VARIOUS METHODS OF PLANT PROTECTION.

9.3.1

Wind

If the plants in the school garden are not protected, they can be damaged by wind, but this can be avoided with **simple protection**. The protection should be breathable; avoid building walls or fences. If possible, plant a hedge or set up a wooden mesh. If you only need to protect young plants, you can place a low fence around them.

9.3.2

Hail

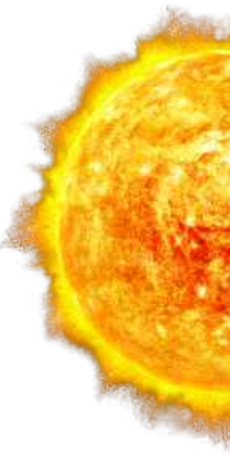
Hail causes significant damage to gardens every year. To avoid this, you can use some simple methods in the school garden. The most common one is **installing hail netting**, which is stretched over the garden to absorb the impact and prevent damage to the plants. You can set it up on several tall poles that are driven into the ground. Smaller plants can be protected with plastic tunnels, jars, or bottles.

9.3.3

Impact of temperature

Protecting plants from frost and excessive heat is also very important in the school garden, as improper temperatures are one of the main causes of poor yields.

When protecting plants **from frost**, students can actively participate under the teacher's guidance by **covering plants** with blankets and mesh or providing natural protection with mulching. One of the most effective methods, which is also useful for warming the soil, is using **tunnels** that you can make yourself. You only need a few sticks (wooden, metal, or plastic) to form an arch over the garden bed, and strong, transparent plastic that you stretch over the sticks. You can also make a tunnel from a piece of old irrigation pipe, which you can use as support arches and lean smaller glass panes against it. Smaller tunnels to protect seedlings can be made from transparent plastic bottles.



Protection against **extremely high temperatures** (above 30°C) is also very important, as plants stop functioning at these temperatures. To combat this, you can use mulching, early morning watering (which allows the water to be absorbed by the soil rather than evaporating), mulching to prevent soil overheating, and even shading (such as using old sheets) to prevent direct sun exposure.

9.3.4

Greenhouse

A greenhouse is a very useful addition to any garden as it allows you to start growing plants earlier, cultivate sensitive varieties, and extend the growing season. Place it in a sunny location, protected from strong winds.

With the help of the greenhouse, teachers will **encourage students to think about different gardening methods**. Students will be able to **compare** the growth of plants in various types of soil, on basic soil, in raised beds, and in controlled conditions within the greenhouse. They will observe differences in growth and the dependency on conditions such as temperature and humidity. This will help them understand how different factors affect plant growth and development, providing them with a deeper understanding of gardening and food production in various environments.

Purchasing a new greenhouse can be a significant expense for a school, so it's worth checking online or local markets for available offers.

You can also ask parents or the local community for help. Funds for purchasing the greenhouse can be raised at school events, where you can showcase your produce and work on the garden.

CHAPTER 10

Annual task calendar

The school year begins in autumn, when the garden is ready for harvest and preparation for the next season. It is important to plan and carry out activities with the students throughout the year, which not only ensures plant health and successful harvests but also helps develop sustainable gardening principles, responsibility, and an understanding of the importance of their contribution to food production.

We have prepared a provisional calendar of annual gardening tasks that will help you organize work on the urban school garden and involve students in various seasonal activities.

10.1

Autumn

(SEPTEMBER–NOVEMBER)

Autumn is the time for **harvesting crops** and **preparing the garden** for the winter months. With students, you can harvest produce that has ripened over the summer but hasn't been picked yet (such as tomatoes, zucchini, potatoes, peppers, and other vegetables).

Harvesting is a **great opportunity for students** to appreciate the work they've done earlier in the season and monitor the quality and quantity of the crops.

Additionally, the autumn months are reserved for **preparing the garden for winter**. Beds that will not be used during the winter should be dug up and enriched with compost or organic fertilizer. You can cover the beds with mulch (straw, leaves, or compost), which will help protect the soil from erosion and frost. Make sure to **plant fall vegetables**, such as winter lettuce, spinach, and lamb's lettuce, which will be ready for harvest in early spring.

Early in the autumn, or when temperatures are still moderate, you can plant **buckwheat** for green manure. Buckwheat will grow in a few weeks, improve the soil structure, and enrich it with organic matter. It is important to mow it or till it into the soil before the frost, as it cannot survive the winter.

Autumn is also an excellent time **to plan** plantings for the following year. Involve students in planning the gardening activities, new crop rotations, and sowing or planting. Together, decide which vegetables to sow or plant in the spring and where they will grow best.

Teach students the importance of soil health and its preparation for the next growing season.

Buckwheat is an ideal choice for green manure.

10.2
Winter
(DECEMBER–FEBRUARY)

In the winter period, plants are usually dormant, but that doesn't mean there is no work to be done in the garden. The beds you covered with mulch in the autumn will be well-protected, and the soil will retain its structure. During this time, teachers can **educate students on the importance of maintaining soil health** and **protecting plants from the cold**.

Winter is also the time when you can **repair gardening tools** and **plan** for the upcoming season on the urban school garden. Together with students, you can **prepare seedlings** for early spring sowing or explore how plants are adapted to winter dormancy.

Remember to observe **wildlife** visiting your garden. Set up a birdhouse and observe which birds will visit.

You can also use the winter months to **grow microgreens** or **sprouts** indoors, allowing students to stay engaged in gardening even in the colder months, while also learning about fast-growing plants and their role in food security.

Plants such as garlic, onions, and other bulb plants can remain dormant throughout the winter, but they will start to grow early in the spring.

10.3
Spring
(MARCH–MAY)

Spring is the busiest time in the garden. With active soil preparation for gardening, you can start with the students as early as **March**. Turn over the garden beds, aerate them, and enrich the soil with organic fertilizer or compost. In **May**, when the risk of frost has passed, you can transplant seedlings that you've previously grown indoors.

The spring months are also ideal for teaching students about the **importance of gardening**, as nature awakens and plants begin to grow and develop again.

Students should actively participate in all gardening tasks, such as weed removal, mulching, and caring for young seedlings, as this will provide them with practical knowledge and an understanding of the importance of sustainable food production.

You can teach students how to **prepare and protect young seedlings** from adverse weather conditions (creating tunnels, using plastic covers).

in the early spring months, you can start sowing vegetables such as lettuce, spinach, or radishes.

10.4 Summer (JUNE–AUGUST)

During the summer months, when most students are on **vacation**, the urban school garden still requires attention.

Heat and drought can quickly dry out the soil, so **regular watering** and soil aeration are essential for maintaining a healthy garden. **Mulching** with straw or compost plays a vital role in retaining moisture and preventing weed growth, so we recommend covering the garden with mulch before the end of the school year.

Since school holidays last almost the entire summer, it is important to **arrange in advance who will take care of the garden during this period**. This responsibility can be taken over by teachers, parents, grandparents, or other volunteers from the local community. You can also organize **"summer gardening teams"**, consisting of students who volunteer to take care of the garden during the vacation. You can also involve neighbors, who will help care for the garden in exchange for produce.

Prepare the **gardening schedule** and a list of tasks to be completed during the summer in advance. This includes watering, weeding, harvesting produce, and monitoring the health of plants.

volunteers can take care of the garden in exchange for the summer harvest.

WORK ON THE URBAN SCHOOL GARDEN SHOULD BE PLANNED THROUGHOUT THE YEAR, WITH SEASONAL TASKS BEING CARRIED OUT ACCORDING TO THE PLAN AND, OF COURSE, IN RESPONSE TO ONGOING NEEDS.

With the students, you can create a sustainable garden that will provide all participants with a platform for sustainability experiences and a bountiful harvest.

Summer duty schedule:

We have prepared a simple draft schedule where students or other volunteers can sign up for summer work on the school garden.

We recommend that at least 3 students or volunteers participate each week. The summer duty starts at the end of June and ends in September. In the "Notes/Tasks" column, you can write down the completed gardening activities, such as watering, weeding, and harvesting crops. The schedule can also be prepared in digital form, which will make it easier to record and track activities on the garden.

Appendix 4:

Summer duty schedule

CHAPTER 11

Sowing calendar

A sowing calendar is a key tool for organizing gardening activities year-round. It helps both teachers and students learn when and how to plant different vegetables, encouraging better planning and more successful plant growth on the urban school garden.

We have prepared a sowing calendar template where students can record the sowing time, seed spacing, and row spacing for each crop. You can find this information in the guidebook, online, or by consulting parents, grandparents, neighbors, or local farmers.

In the spirit of active learning, students should research when and how plants are seeded, thereby developing skills in planning and responsibility.

Appendix 5:

Sowing calendar

CHAPTER 12

Preparing the garden bed

Preparing the bed is an important part of every school garden and an excellent opportunity to engage students in hands-on learning about nature and gardening. Through the process of preparing the bed, students learn the basics of gardening and develop skills such as planning, caring for the soil, and observing natural processes.

Before starting the physical work in the garden, first focus on planning with the students. Encourage them to sketch a garden layout and determine the space for the beds. Together, discuss where the bed will be, how large it will be, whether it will be enclosed, and whether paths will be made between the beds. Students can draw the beds and paths, including benches, birdhouses, or insect hotels. Agree on which materials to use for the borders (wood, stone, recycled materials, etc.), which will not only enhance the visual appeal of the garden but also protect it from external factors.

12.1

Simple garden bed

A simple garden bed is an **excellent starting point** for working with young gardeners. Use the method of **cardboard or newspapers**, which are placed directly on grass or soil. Then, pile about **40 cm** of quality garden soil mixed with compost on top. The cardboard or paper will prevent weed growth, while the soil above it will become fertile and suitable for planting. This type of bed does not require digging, making it **ideal for urban environments** where the soil may be very compacted.

You can **ask students to bring** a piece of cardboard or newspaper **from home**. On the garden, show them how to properly lay down the cardboard and add the soil. While doing this, the students can mix the soil and compost and ensure an even distribution across the surface.

12.2

Autumn garden bed

An autumn quick bed is ideal when you want to prepare a garden bed **quickly** and **efficiently**, without removing grass or weeds. On the marked area, mow the grass and store it for later use. Then, spread cardboard, newspaper, or old fabric over the area. On top of this layer, add **compost**, **mowed grass**, and **kitchen waste** such as peelings or vegetable scraps. Cover everything with a layer of dry leaves or branches. The layer will **decompose** by spring and create a rich foundation for planting.

Have the **students gather** dry leaves and branches to use as the final layer. Together with them, you can **periodically check** how the material is decomposing and **encourage** them to observe the changes in the soil structure.

12.3

Green manure

Green manure is an important part of gardening as it **helps enrich the soil** and **improve its structure**. Plants like **buckwheat**, **clover**, or **vetch** grow quickly and prevent weed growth. When you mow them and incorporate them into the soil, you add **valuable organic matter** and contribute to the soil's health.

Share the benefits of green manure **with the students** and involve them in the process of sowing plants and fertilizing with them.

12.4

Designing garden beds and borders

Designing borders around garden beds can be a fun and creative project for students. **Use recycled materials** such as old ceramics, tires, or wooden planks, and work with students to create unique borders that will give the beds a special look. This will not only enhance the appearance of the garden but also help prevent weed growth and protect the garden beds.

Encourage students to gather materials for the borders themselves. At home or within the local community, they should look for old items that can be repurposed. Let them create the borders for the garden beds on their own, using natural materials such as stones and wood. This will inspire them to reuse materials and think creatively.

12.5

Labels for plants

Labeling the beds and plants in the school garden is important both for **organizing** the garden and for the students, who learn to recognize plants, develop a sense of order, and track the **growth progress** of individual crops. When students know which plant is growing in a bed, they can more easily **observe changes** in growth and learn how environmental factors affect the plants.

Plant and bed labels also provide a great educational opportunity for teachers. They can be used for different plant types, observing growth, and comparing various growing conditions.

INVOLVE STUDENTS IN THE ENTIRE LABELING PROCESS, FROM SELECTING THE MATERIAL FOR THE LABELS TO CREATING AND PLACING THEM ON THE BEDS. ENCOURAGE THEIR CREATIVITY AND ALLOW THEIR IMAGINATION TO FLOW FREELY.

You can create simple labels with the name of the bed (e.g., "Fruit", "Herbs," "Flowers") or create labels for each individual plant with additional characteristics of the plant.

WE HAVE PREPARED SOME SUGGESTIONS FOR LABELING BEDS AND PLANTS:

Wooden Labels (spoons, stakes, tiles, etc.)

An easy way to label beds and plants is by using wooden labels. Students can write the name on the wood using markers, chalk, tempera paints, or waterproof pens, and then simply drive the labels into the ground.

Stone labels

Students can use larger flat stones as labels, painting the plant names on them with waterproof paints. Students should decorate the stones themselves.

Labels from recycled materials

Encourage students to think about which recycled materials or items they could use for garden bed labels. Consider using preserving jars, bottles, plastic containers, old cans, or ceramic tiles. By using such materials, students develop an awareness of reuse and sustainable practices.

Labels from natural materials

You can encourage students to find materials for labels around the school grounds. They should look for branches and twigs to make a frame, and then attach a piece of cardboard on which the name or illustration of a specific vegetable is written or drawn. Similarly, they can use bark. If they collect larger pieces, they can use them as a base and write the name of the vegetable on it using waterproof markers.

Using QR Codes

If you want to incorporate a bit of digital literacy into gardening, create QR codes with links to websites about vegetables. Add the QR codes to the labels, which will direct students to trusted websites where they can find basic information about the plant.

12.6

Raised garden beds

Raised beds are one of the most practical solutions for urban school gardens, as they provide easier access for students to observe plants and reduce the need for physically strenuous tasks. Since they allow control over soil quality, raised beds are especially suitable for areas with less fertile soil, which is often the case in urban environments.

In addition, raised beds offer an opportunity to teach and learn about sustainable gardening, as they can be made from natural or recycled materials and filled with organic layers that promote soil fertility and health.

12.6.1

Advantages of raised beds

RAISED BEDS IN AN URBAN SCHOOL GARDEN OFFER NUMEROUS BENEFITS:

1. **Adjustable height:** The bed height can be adjusted according to the needs of students, making it easier to work with plants and providing better access. This is especially helpful for younger students or those with special needs.

2. **Improved soil quality:** By filling the raised bed with layers of compost, organic waste, and soil, you can create the perfect soil mix for different plants.

3. **Earlier gardening:** Since organic matter generates heat during decomposition, the soil warms up earlier, allowing you to start planting and sowing earlier than with regular soil.

4. **Less work:** There is no need to till or fertilize additionally. If you use mulch, the soil will remain healthy and fertile.

5. **Water:** Water does not stagnate on the surface, reducing the risk of rot. At the same time, the raised bed retains enough moisture inside, ensuring that water is available to plants even on hot, dry days.

12.6.2

Building a raised bed

BUILDING A RAISED BED CAN BE A PRACTICAL AND FUN PROJECT FOR STUDENTS. WITH THE RIGHT MATERIALS, YOU CAN CREATE A BED THAT WILL BE IN USE FOR MANY YEARS, WHILE ALSO TEACHING STUDENTS THE BASICS OF GARDENING, SUSTAINABLE PRACTICES, AND TOOL USAGE.

To create a simple raised bed, you will need:

1. **Wooden boards** (larch or spruce wood is ideal)
2. **Wire mesh** for protection against voles
3. **Screws, brackets,** and other fasteners
4. **Waterproof film** to protect the wood from moisture
5. **Organic material** (branches, leaves, compost) and garden soil

Construction procedure:

1. **Choose the right location:** First, find a sunny spot in the schoolyard where the raised bed will be placed. It is recommended to involve students in choosing the location, as this will help them develop planning skills and understand the needs of plants.

2. **Assemble the frame:** Students should assist in constructing the wooden frame. Arrange the boards in a rectangular shape and secure them with metal screws. Make sure the frame is stable and level.

3. **Protect the bottom:** Lay down the mesh to protect against pests. This will prevent pests, such as moles, from damaging the plant roots.

4. **Fill the bed:** The construction of raised beds is based on several layers that help retain moisture and allow for slow decomposition. We recommend that students fill the raised bed with the following layers:

- **top layer:** high-quality garden soil mixed with compost, ready for planting;
- **middle layer:** organic materials, such as green plant waste, mowed grass, leaves, and smaller plant debris;
- **bottom layer:** coarser organic waste, such as branches, wood chips, or thicker plant stems. These materials create drainage and ensure that water does not stagnate.

WHILE FILLING THE BED, YOU CAN EXPLAIN TO STUDENTS THE IMPORTANCE OF LAYERING MATERIALS AND HOW DIFFERENT LAYERS HELP RETAIN MOISTURE AND RELEASE NUTRIENTS. ENCOURAGE THEM TO GATHER ORGANIC MATERIALS (SUCH AS DRY LEAVES) AT HOME AND BRING THEM TO THE SCHOOL GARDEN.

12.6.3

Plant selection

When choosing plants for raised beds, it's important to consider the location of the bed as well as the plants' needs for light and moisture. Raised beds tend to have drier soil than traditional garden beds, so it's best to select plants that tolerate warmer and drier conditions. Allow students to choose some of the plants they want to grow in the bed. This will help them feel more engaged in the process and will increase their enthusiasm for caring for the plants.

Recommended plants for raised beds:

- **Vegetables:** tomatoes, peppers, lettuce, beans, cucumbers.
- **Herbs**: basil, rosemary, mint, thyme.
- **Flowers:** marigolds, nasturtiums, sunflowers.

Raised beds are an incredibly useful tool for education and training in urban school gardens. Not only are they practical and easy to maintain, but they also provide students with an opportunity to engage in sustainable gardening practices.

By involving students in all stages of preparing and caring for the beds, you will create an environment in which they learn through hands-on experience and develop a responsible attitude towards food production and self-sufficiency.

12.7

Container gardening

IN URBAN ENVIRONMENTS, ONE OF THE BIGGEST CHALLENGES THAT OFTEN LEADS TEACHERS TO ABANDON THE IDEA OF A SCHOOL GARDEN IS THE LACK OF SPACE. THERE IS NO ROOM FOR A TRADITIONAL GARDEN IN THE GROUND OR FOR RAISED BEDS. WHAT NOW? NO WORRIES. YOU CAN CREATE AN URBAN SCHOOL GARDEN RIGHT IN CONTAINERS.

12.7.1

Advantages of container gardens

1. **Flexibility:** Containers can be placed on sunny surfaces, balconies, terraces, staircases, or windowsills.

2. **Mobility:** Plants in containers can easily be moved around based on sunlight or weather conditions.

Gardening in containers has many advantages, especially for city schools where space is limited.

3. **Learning about plant needs and growth:** Students can observe different growing conditions (water, light, nutrients) and compare plant growth in various containers.

12.7.2

Choosing containers for gardening

Containers for plants come in various shapes and sizes and are made from different materials. It's important that the containers are large enough to give plants enough space for their roots and that they have drainage holes to allow excess water to drain.

WHAT ELSE CAN YOU USE BESIDES TRADITIONAL PURCHASED FLOWER POTS?

Clay pots or old flower pots:

These are aesthetically pleasing and sustainable, as they allow for the reuse of old items that would otherwise be discarded.

Ceramic or plastic containers:

Everyday objects can be repurposed into pots for vegetables. You can show students how important recycling is and how, with creativity, old items can be given new purposes.

Tree trunks and branches:

You can carve out space for plants from larger pieces of tree trunks or branches, connecting students to natural materials.

Old car or bicycle tires:

Old tires can be used as planting containers. When painted or even decorated, they become unique planters for your garden.

Discarded items:

Encourage students to bring old items from home that they think could be used as plant pots. This promotes sustainable thinking across the family. This activity can be linked to art lessons, where students decorate or paint the containers.

12.7.3

Designing a container garden

WHEN DESIGNING A CONTAINER GARDEN, IT'S IMPORTANT TO PLACE THE PLANTS IN LOCATIONS WHERE THEY WILL RECEIVE ENOUGH LIGHT AND BE PROTECTED FROM UNFAVORABLE WEATHER CONDITIONS. IT'S ALSO SENSIBLE TO PLACE THE CONTAINERS IN AREAS WHERE THEY ARE ACCESSIBLE TO STUDENTS, SO THEY CAN OBSERVE THE GROWTH OF THE PLANTS AND TAKE CARE OF THEM.

Some tips for organizing and designing container gardens:

1. **Grouping plants:** Place containers with plants that have similar water and light requirements together. This will make care easier and help students understand which plants need similar conditions.

2. **Arranging by height:** Place taller plants at the "back" of the garden, and smaller plants in the front. This will give students a clear view of all the plants.

3. **Colors and shapes:** Add variety to your container garden by using containers of different colors and shapes. Allow students to decorate the containers with colors and patterns, which will give the garden a unique look.

Organize the containers in a way that allows students to track changes in individual plants. At the beginning, students should record the initial height of the plants and then monitor their progress weekly.

IN CONTAINERS, YOU CAN SOW OR PLANT VARIOUS TYPES OF PLANTS, FROM VEGETABLES AND HERBS TO FLOWERS. IT'S IMPORTANT TO CHOOSE PLANTS THAT ARE SUITABLE FOR GROWING IN CONTAINERS AND DO NOT REQUIRE TOO MUCH SOIL.

We recommend the following plants:

Vegetables: tomatoes, peppers, lettuce, radishes, peas, and zucchini are ideal plants for containers, as their roots do not require a lot of space.

Herbs: basil, rosemary, mint, thyme, and oregano grow well even in smaller containers and are perfect for urban school gardens.

Flowers: marigolds, nasturtiums, and daisies are attractive flowers that will add color to the container garden and attract pollinators.

Teachers, encourage students to choose some plants themselves to sow or plant in their containers. This will help them feel more connected to the garden, and they will take greater responsibility for caring for the plants.

Potatoes in a “Container”:

On an urban school garden, you can even grow potatoes.

In early spring, prepare a container with a diameter of at least 30 cm (a rubber tub, plastic bucket, or pot). Place a handful of broken pottery pieces at the bottom for drainage and add 20 cm of compost (or potting mix). Place the seed potatoes with the shoots facing upwards, then cover them with another 20 cm of compost and soil (or potting mix). Water well and, if necessary, cover with newspaper to protect from frost. When the shoots grow to 10 cm, mound them with more compost and soil (or potting mix). Continue to mound the plants until the container is filled to the top. Water the plants regularly and add liquid organic fertilizer every two weeks. Once the potatoes begin to flower, you can start harvesting.

Involve the students in the entire process, from planting to harvesting.

12.7.4

Care and maintenance

One of the key challenges in container gardening is **proper water management**. Since plants in containers are more exposed to drying out than those in the ground, it’s important for students to **water the plants regularly**. However, they must also be careful not to overwater, as excess water can lead to root rot.

Here are some tips for caring for container plants:

1. **Regular watering:** Containers lose moisture faster than traditional garden beds, so it’s important for students to regularly check the soil moisture and water the plants as needed.

2. **Adding fertilizers:** Since the amount of soil in containers is limited, it’s important for students to regularly add natural fertilizers to provide the plants with necessary nutrients.

3. **Pruning:** Show students how pruning can encourage better growth and help remove dead leaves or flowers.

Despite the limited space, container gardening offers great creativity and learning opportunities, focusing on plant care and nature observation.

Container gardening is an excellent solution for schools that lack space for traditional gardens. Through the learning process, students will become familiar with the basics of gardening and ecology.

CHAPTER 13

Sowing seeds and planting plants

Sowing and planting are fundamental steps in plant cultivation, whether in garden beds, raised beds, or even in pots and containers. Teachers who conduct gardening activities with their students can present these two processes in various ways, depending on the availability of space, plants, weather conditions, and also the students themselves (age, knowledge, motivation) and educational goals.

STUDENTS CAN SUCCESSFULLY GROW SEEDLINGS USING VARIOUS CONTAINERS, SEED TRAYS, OR EVEN WITHOUT PACKAGING, GAINING VALUABLE GARDENING KNOWLEDGE AND DEVELOPING RESPECT FOR FOOD PRODUCTION AND NATURE ITSELF.

13.1

Sowing in different containers

You can use various materials for sowing, such as **yogurt cups**, **cardboard containers**, **egg cartons**, **plastic packaging**, and even **eggshells**.

Sowing procedure:

1. Fill the selected container with well-prepared soil or compost. The soil should be loose and moist to allow for easy germination.

2. Use your finger or a stick to make small holes in the soil, into which you place the seeds.

3. Gently cover the seeds with soil and lightly press them down so that the seed is in good contact with the soil.

4. Water gently with a stream of water or a spray bottle.

5. Place a label with the name of the plant you sowed in the container.

6. Put the containers in a warm place, with the optimal temperature for germination being around 26 °C.

ENCOURAGE STUDENTS TO REUSE HOUSEHOLD ITEMS, SUCH AS YOGURT CUPS AND EGG CARTONS, FOR PREPARING SOWING CONTAINERS, WHICH WOULD OTHERWISE END UP IN THE TRASH.

This will not only encourage their creativity, but also **raise awareness among students' family members** about sustainability and waste reduction. Pay special attention to observing the growth and watering of the seeds, as young seedlings need sufficient moisture.

You can also use **seed trays**, which are particularly suitable for growing a large number of plants in a limited space. Each seedling has its own separate space, which prevents root tangling and makes transplanting easier. Students can observe the growth process from seed to seedling, which is both educational and fascinating. The sowing process is the same as described above.

13.1.1

Sowing in eggshells

We have prepared instructions for sowing in eggshells, which can provide an interesting gardening experience. Students will practically learn about natural processes of germination and plant growth, while also participating in recycling eggshells.

Materials and tools:

- eggs
- egg carton
- seeds
- soil
- small spoon
- water sprayer
- awl or large needle

Sowing in eggshells offers an engaging gardening experience.

Procedure:

1. **Preparing the Eggshells:** Carefully break the eggs and try to keep the halves of the shells intact. Use the eggs in cooking, then rinse the shells thoroughly with water. To remove any traces of egg white and yolk, boil the eggshells in hot water for a few minutes. Once the foam stops forming on the surface, rinse the shells again and let them dry completely.

2. **Preparing Drainage:** Once the shells are dry, place a kitchen towel on a surface and gently poke a hole in the bottom of each eggshell using an awl or a large needle. This hole will allow excess water to drain when the seeds are watered. Place the shells back in the egg carton.

3. **Adding Soil:** Using a small spoon, fill each eggshell with soil, leaving a little space at the top.

4. **Sowing:** Place the seed or seeds in each eggshell, placing them at the appropriate depth in the soil. Lightly spray the soil with a water sprayer to keep it slightly moist.

5. **Care and Growth:** Place the eggshells in a bright, warm location. Regularly spray the soil with water to ensure the seeds have enough moisture for germination.

6. **Transplanting:** When the seedlings are large enough, transplant them into the garden along with the eggshell. The roots will grow through the shell, which will slowly decompose and provide nutrients to the plants.

YOU CAN ALSO CONDUCT A SIMPLE EXPERIMENT WITH STUDENTS. PLANT SOME SEEDS IN EGGSHELLS USING THE METHOD DESCRIBED, AND PLANT OTHERS DIRECTLY IN THE GARDEN OR PLASTIC POTS. TRACK WHICH PLANTS GERMINATE FASTER AND GROW BETTER. COMPARE THE RESULTS OF YOUR OBSERVATIONS AND DISCUSS THE IMPACT OF DIFFERENT CONDITIONS ON PLANT GROWTH.

13.2

Soil preparation

PROPER SOIL PREPARATION IS CRUCIAL FOR THE SUCCESSFUL GROWTH OF SEEDLINGS. YOU CAN USE PURCHASED SOIL OR PREPARE YOUR OWN MIX, WHICH INCLUDES GARDEN SOIL, COMPOST, AND OTHER ORGANIC ADDITIVES.

Homemade soil:

Advantages: It is free, contains natural nutrients.

Disadvantages: It takes more time to prepare and may contain pests.

Purchased soil:

Advantages: Ready to use, free from pests and diseases.

Disadvantages: Requires a financial investment and more frequent watering.

Encourage students to use homemade compost and soil for gardening whenever possible.

Composting can also be an important part of the educational process, in which students learn how **organic waste becomes a valuable resource** for plant growth.

13.3

Conditions for growing seedlings

To ensure successful germination and growth of seedlings, it is essential to provide the key conditions such as temperature, light, moisture, and nutrients. Each of these factors plays an important role during the different stages of plant growth.

Temperature:

A high temperature is necessary for germination, ideally around 26°C. Once the seeds sprout, the temperature should be reduced to about 18-20°C.

Light:

Light is crucial for growth after germination. Without light, plants will stretch and become weak. It is important to place the containers with young seedlings in a bright location.

Moisture:

The soil must always be moist but not overly wet. Too much water can lead to rotting of the seeds or young roots.

Nutrients:

Nutrients are not as important during germination, but after sprouting and transplanting, seedlings need to be fed with mild organic fertilizers.

STUDENTS SHOULD MONITOR THE GROWING CONDITIONS OF THE SEEDLINGS. THEY CAN OBSERVE HOW DIFFERENT FACTORS (SUCH AS LACK OF LIGHT OR EXCESSIVE TEMPERATURE) AFFECT PLANT GROWTH.

13.4

Pricking of seedlings

Pricking is the process of transplanting young seedlings into a larger space to allow their root systems to develop and grow. Seedlings are delicate during this process, so it is important to handle them **carefully**.

Procedure:

1. Gently remove the seedlings from the seed tray or container/pot/...
2. Prepare new containers with moist soil and create small holes where you will transplant the seedlings.
3. Place the seedling into the hole, cover it with soil, and lightly press down to ensure the roots are securely in place.
4. After transplanting, water the seedlings and place them in a bright and warm location.

PRICKING IS A DELICATE PROCESS, SO EXPLAIN TO STUDENTS THE IMPORTANCE OF HANDLING SEEDLINGS CORRECTLY. BE CAREFUL NOT TO DAMAGE OR HARM THEM.

This activity provides an excellent opportunity to develop motor skills and a sense of responsibility.

13.4.1

Importance of space & conditions after transplanting

ONCE THE SEEDLINGS HAVE BEEN TRANSPLANTED, IT IS IMPORTANT TO PROVIDE THEM WITH THE PROPER CONDITIONS FOR FURTHER GROWTH.

1. **Temperature:** After transplanting, reduce the temperature to 15–18°C, which prevents the plant from growing too quickly and allows the roots to establish.

2. **Light:** Transplanted seedlings should be placed in a bright location, as light encourages photosynthesis and healthy growth.

3. **Moisture:** After transplanting, ensure that the soil remains moist but not waterlogged. Water carefully, as the young roots are still developing their resilience.

PROVIDING THE RIGHT CONDITIONS AFTER TRANSPLANTING IS CRUCIAL FOR THE GROWTH OF HEALTHY SEEDLINGS.

TEACHERS CAN MONITOR THE CHANGES IN GROWTH WITH STUDENTS, FOSTERING CURIOSITY AND ANALYTICAL SKILLS IN THE STUDENTS.

CHAPTER 14

Watering

Watering is one of the most important gardening tasks and is often a favorite activity for primary school students. Teachers can encourage students to water regularly and teach them how to do it properly and efficiently.

14.1

Basic watering rules

Plants require different amounts of water depending on their type, growth stage, soil type, and the climate in which they grow. During dry periods, it is important to provide plants with enough water, but it is crucial that watering is done correctly.

When to water?

The best time to water is in the **morning** or **late afternoon**, as this helps avoid water loss due to evaporation, which is particularly important during warmer months.

You can remind students that watering in the middle of the day on sunny days is less effective.

How to water?

Water plants **directly at the roots**, not on the leaves, to prevent the possibility of diseases and increase the effectiveness of the water.

Teach students the correct watering techniques to ensure that plants receive the necessary amount of water.

How often to water?

During dry periods, plants need more water, but water them less frequently, but more abundantly, to encourage the development of deep roots.

Students can observe the difference between shallow and deep watering and monitor the growth of the plants.

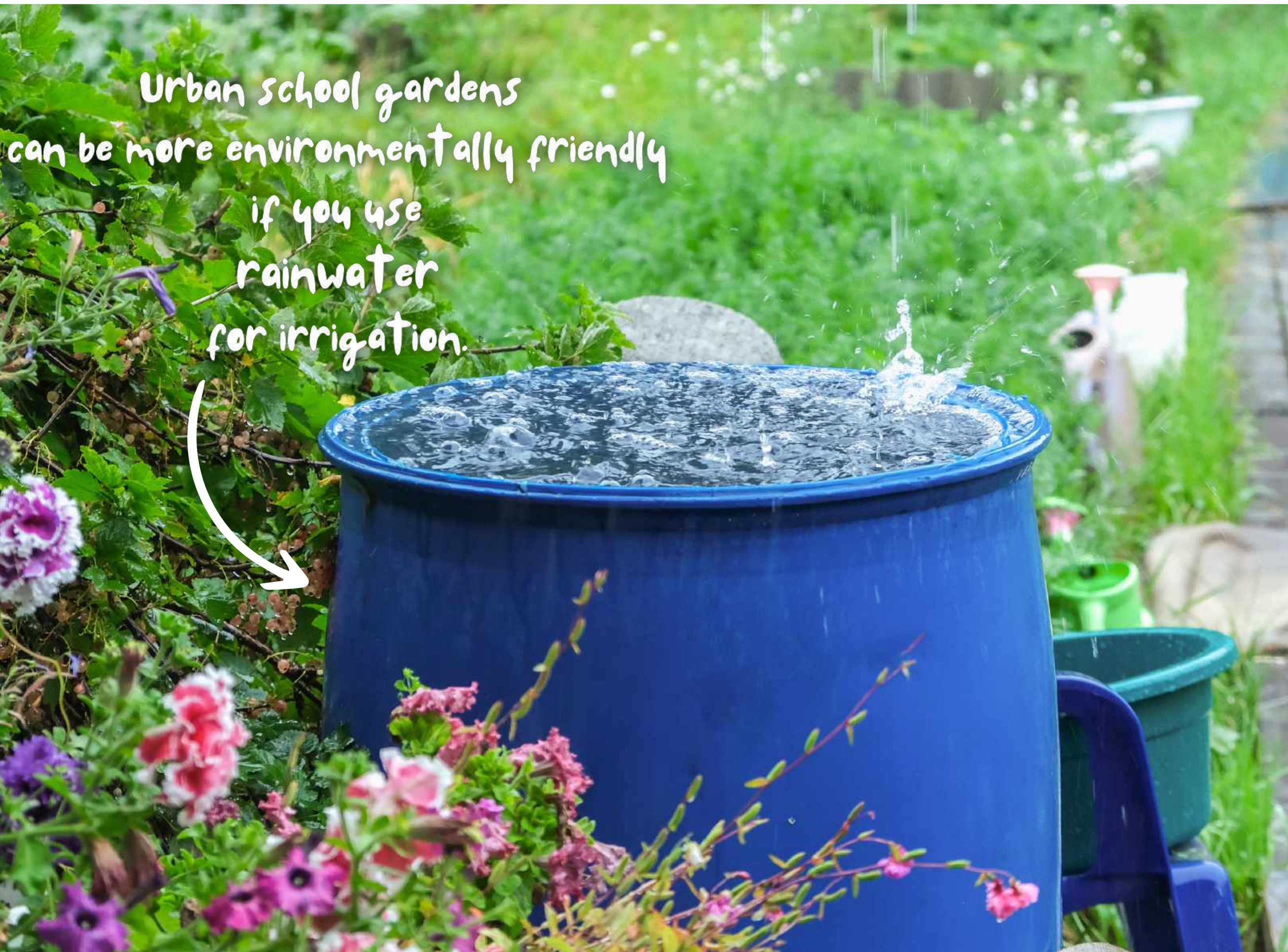
14.2

Water conservation

Rainwater collectors are a simple way for children and young people to learn about the importance of conserving water. Students can participate in installing water collectors and track how much water they can gather on a rainy day.

You can also use **greywater** (water leftover from washing vegetables or other food, which is very suitable for watering garden plants).

TEACHERS CAN CONDUCT AN EXPERIMENT WITH STUDENTS, COMPARING THE EFFECTS OF DIFFERENT WATERING METHODS. ONE GROUP OF PLANTS SHOULD BE WATERED REGULARLY, ANOTHER USING THE DEEP WATERING PRINCIPLE WITH FEWER WATERINGS, AND A THIRD SHOULD USE PLASTIC BOTTLES FOR WATERING (FILL A BOTTLE WITH WATER, MAKE A FEW HOLES IN IT, AND BURY IT NEAR THE PLANTS SO THAT WATER SLOWLY DRAINS INTO THE SOIL). STUDENTS CAN DOCUMENT PLANT GROWTH AND HEALTH AND ANALYZE WHICH METHOD WAS MORE SUCCESSFUL.



CHAPTER 15

Selection of plants

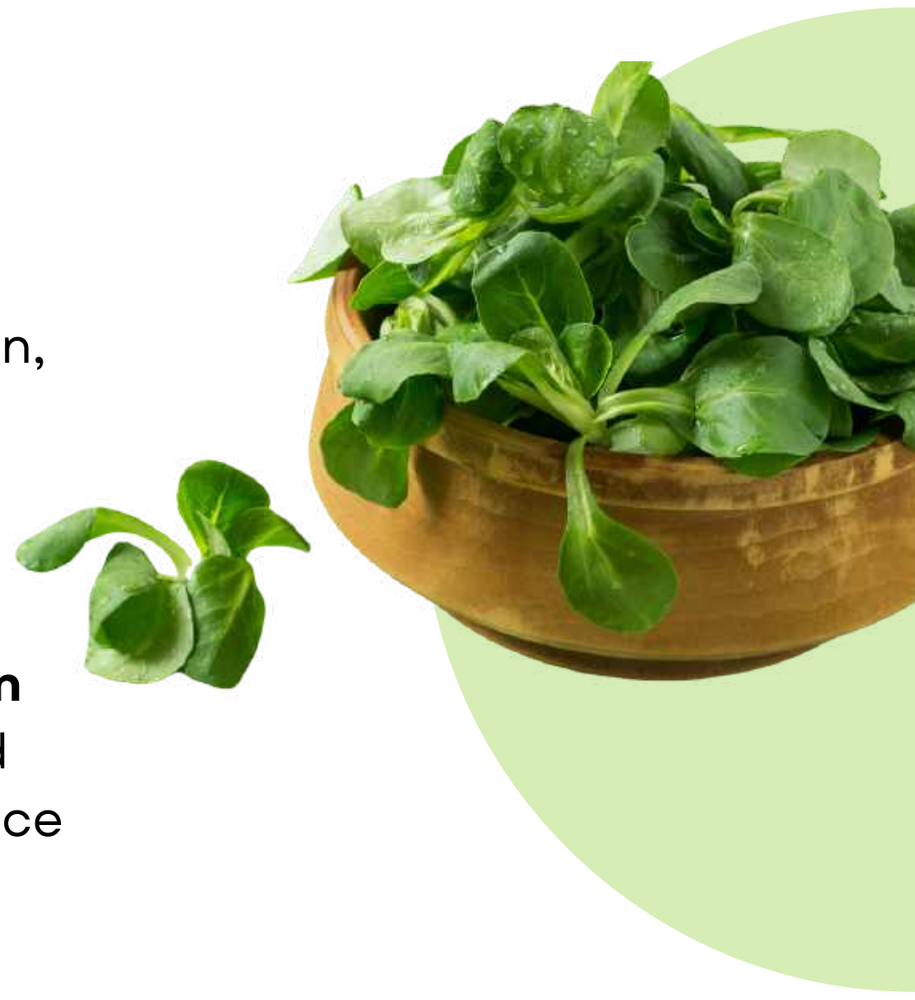
The selection of plants you will grow on the urban school garden is very important. Teachers, keep in mind that in addition to the practicality and accessibility of seeds and seedlings, it is crucial to consider the gardening heritage of your country and choose native and domesticated varieties. These varieties have adapted to climate and soil over centuries, providing a rich yield. They also offer students a connection to the nation's heritage, while teaching them about the importance of local production and biodiversity.

WHEN CHOOSING THE PLANTS YOU WILL GROW IN YOUR URBAN SCHOOL GARDEN, TAKE INTO ACCOUNT BOTH THE PRACTICALITY AND AVAILABILITY OF SEEDS AND SEEDLINGS, AS WELL AS THE GARDENING HERITAGE OF YOUR COUNTRY.

Indigenous varieties represent an important part of national identity and sustainable agriculture.

You can also include some **exotic plants** in your selection, allowing students to explore how the climate affects growth and analyze the reasons why non-native plants may not thrive in your area.

When selecting plants, also pay attention to the **location** where you will be planting them. For example, in a raised bed, the soil dries out faster than in the ground, and space is limited, so it is advisable to choose resilient and productive plants.



15.1

Vegetables

Growing vegetables in an urban school garden is highly valuable, as it allows students to better understand **where the food** they consume daily **comes from** and learn about the importance of **local production**. Additionally, it encourages **healthy eating habits**.

Fresh, home-grown vegetables can serve as **motivation** for students to include vegetables more frequently in their diet, contributing to **healthier eating habits**.

Moreover, growing vegetables helps students develop **practical gardening skills**, such as planting, watering, pruning, and harvesting.

in an urban environment, where contact with nature is often limited, a school vegetable garden serves as an ideal space for learning about food production, processing, and use, as well as biodiversity and sustainable practices.

15.1.1

Tomatoes

Tomatoes are one of the most popular vegetables due to their versatile culinary uses and rich content of vitamin C and potassium.

Ripe tomatoes can be used immediately in dishes or preserved for later use.

For successful growth, tomatoes require a **sunny location** and **humus-rich**, well-drained soil. They prefer slightly acidic to neutral soil. It is recommended to add compost or organic fertilizer to the soil to stimulate growth and ensure a more abundant harvest.

Tomatoes can be **sown** indoors at the end of **February** or at the **beginning of March**. Transplant them outdoors only after the danger of frost has passed (mid-May). Plant the seedlings **deeply**, up to the first leaves, as this encourages the development of strong roots, which ensures better nutrient absorption and greater plant resilience.

Tomatoes require **regular watering**, but be careful not to spray the leaves, as the plant is sensitive to diseases. Regularly remove **side shoots** to improve air circulation and boost yield. Fertilize tomatoes every few weeks, preferably with a natural fertilizer rich in potassium and calcium.

In the garden, tomatoes pair well with onions, garlic, lettuce, and basil, as these plants do not take up much space or nutrients. Avoid planting tomatoes next to potatoes, as they can be affected by the same diseases (such as late blight).

The first fruits **ripen in early summer**, usually in July, and harvesting can continue until October. Fresh tomatoes can be dried, frozen, or processed into sauce for later use.

Growing tomatoes allows students to learn about the growth process from sowing to fruit maturity and their use. Students should participate in sowing seeds and transplanting seedlings in the garden. In the garden, they should monitor plant growth and take appropriate care of them. After harvesting, students can participate in preparing dishes such as salads and sauces, promoting awareness of the importance of locally grown food.

15.1.2

Peppers

Due to their variety of colors and flavors, peppers are among the most popular vegetables. They are a rich source of vitamin C, potassium, and other nutrients essential for health.

in an urban school garden, peppers offer an interesting gardening experience, as different varieties differ in color, size, and taste, ranging from sweet to even spicy.

Peppers thrive best in a **sunny location** protected from the wind, as they require a warm and bright environment for optimal growth. The soil should be **well-fertilized**, humus-rich, and well-drained to prevent water retention and root rot. Before planting, add compost or organic fertilizer to the planting holes.

Seeds can be **sown** indoors as early as **February** or **March**. Once the seedlings develop a strong root system and the risk of frost has passed (usually mid-May), they can be transplanted outdoors. Plant the seedlings **30–45 cm apart** to ensure enough space for growth.

Water the plants regularly and evenly, as drought reduces the quality and size of the fruits. Fertilizing will enhance their resistance to diseases. Regularly remove **side shoots** to maintain plant ventilation.

Peppers grow well alongside vegetables such as garlic, cucumbers, kohlrabi, lettuce, and chives. To protect against pests, consider planting marigolds or nasturtiums near the peppers.

Start harvesting peppers when the fruits are well-colored and have reached full size. If you prefer sweet peppers, wait until they ripen to red, yellow, or orange.

The fruits can be used **fresh**, **frozen**, **dried**, or **preserved in oil** to maintain their nutritional value during the winter months.

STUDENTS SHOULD ACTIVELY PARTICIPATE IN ALL STAGES OF GROWING PEPPERS, FROM SOWING, TRANSPLANTING, REMOVING SIDE SHOOTS, WATERING, TO HARVESTING THE FRUITS. USE THE HARVESTED PEPPERS TO PREPARE SIMPLE DISHES LIKE SALADS OR SNACKS.

15.1.3

Carrots

Carrots are a popular vegetable among both children and adults due to their sweet taste and crunchiness. They are rich in vitamin A, which is essential for eye health, skin, and the immune system.

For successful growth, carrots require **deep**, **loose soil** without clumps and stones, as these can cause the roots to split. It is recommended to **fertilize** the soil well with compost or well-aged manure at least a year before planting, as fresh manure negatively affects growth.

Carrot **seeds** can be sown in tunnels or protected beds as early as **February** or **March**, while direct sowing outdoors can be done from late March to June. Sow in rows spaced **20–25 cm apart**, and thin the plants when they reach about 6 cm in height. **Thinning** requires patience and precision, but it is essential for the development of healthy and thick roots.

In an urban school garden, carrots present an excellent opportunity for learning about root vegetables and gardening activities such as thinning plants and pest protection.

Water the carrots **regularly** with a gentle stream of water to prevent soil erosion around the roots. You can use **mulch** between the carrot rows to help retain moisture and suppress weed growth. Cover the crop with a net to protect it from the **carrot fly**, one of the primary pests that can significantly affect your yield.

Carrots grow well alongside onions, garlic, leeks, lettuce, and spinach. To reduce the risk of pests and diseases, avoid planting them near other root vegetables and **practice regular crop rotation**.

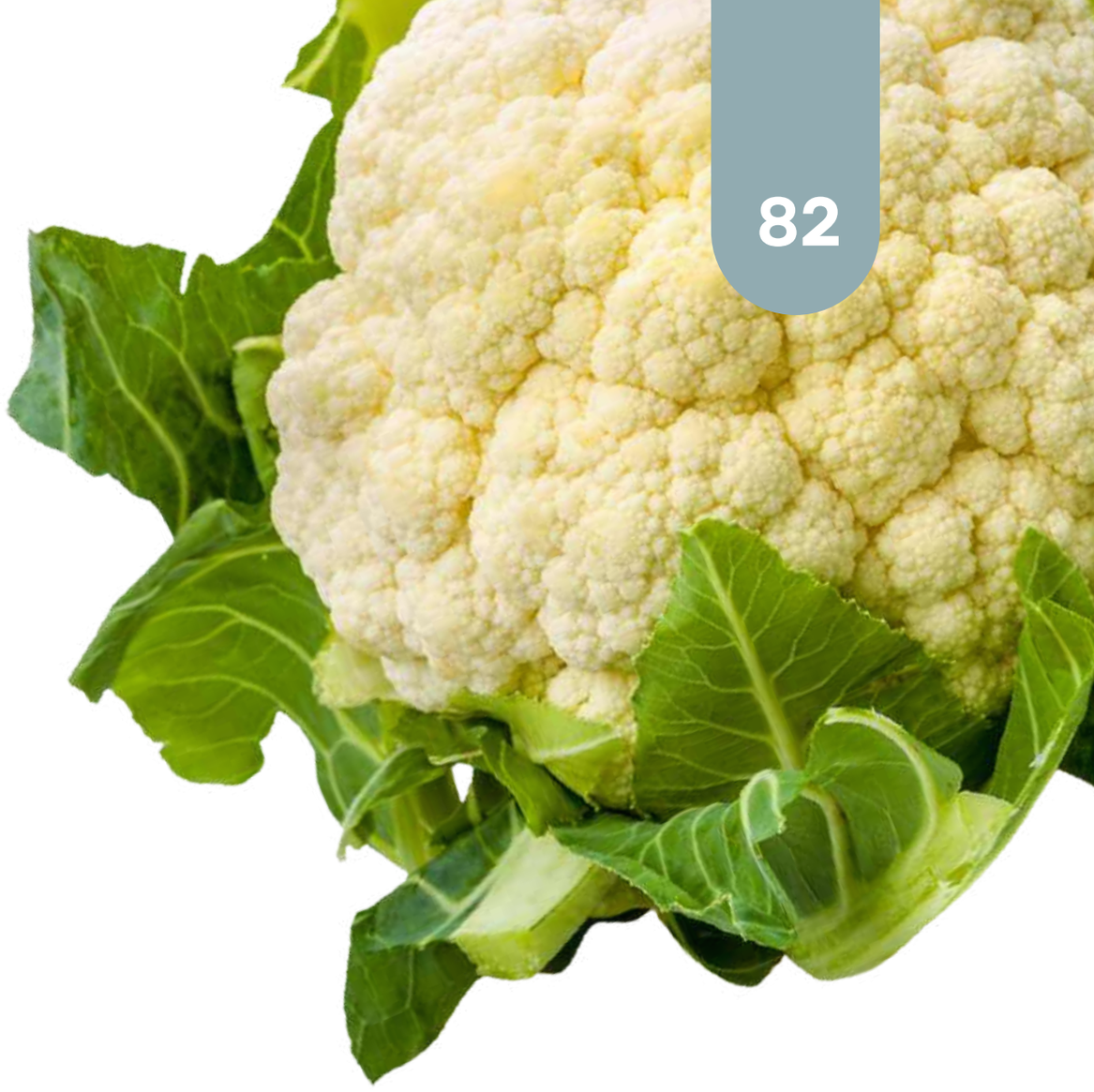
Start **harvesting** carrots **from September onwards** when they reach the desired size and color. The harvested carrots can be used **fresh** or **frozen** for later use. They can also be **stored in a cool place**, such as sand or sawdust in a cellar, where they will remain fresh for several months.

STUDENTS SHOULD PARTICIPATE IN ALL ACTIVITIES RELATED TO GROWING CARROTS. ADDITIONALLY, WITH YOUR GUIDANCE, THEY SHOULD LEARN ABOUT THE NUMEROUS HEALTH BENEFITS OF LOCALLY GROWN CARROTS AND THE IMPORTANCE OF FOOD SELF-SUFFICIENCY.

15.1.4

Cauliflower

Cauliflower is a nutrient-rich vegetable, popular among gardeners for its versatility in the kitchen. It is high in vitamins C and K as well as dietary fiber, and its consumption contributes to a healthy diet.



Cauliflower thrives best in **fertile**, deep soil and a **sunny** location. The soil should be rich in organic matter and well fertilized. Before planting, it is recommended to enrich the soil with organic fertilizer, and during the growing season, **compost** should be applied.

You can sow cauliflower seeds in protected areas as early as **February** or **March** and transplant them outdoors in May. To allow enough space for the curds to develop, space the plants **50–60 cm apart**.

Cauliflower heads require **shading** – gently covering them with their own leaves helps maintain the white color of the curds.

in an urban school garden, growing cauliflower presents a unique challenge, as it requires careful attention and care. However, it offers students valuable insight into the growth and development of brassicas.

Consistent watering is essential for successful cauliflower growth, as a lack of moisture results in smaller and lower-quality heads. Feed the plants with **fertilizers** rich in potassium and nitrogen to improve both the size and quality of the heads.

Plant cauliflower alongside tomatoes, beans, celery, and chard, but avoid planting it near onions, as they may inhibit its growth. **Practicing crop rotation** is also highly recommended.

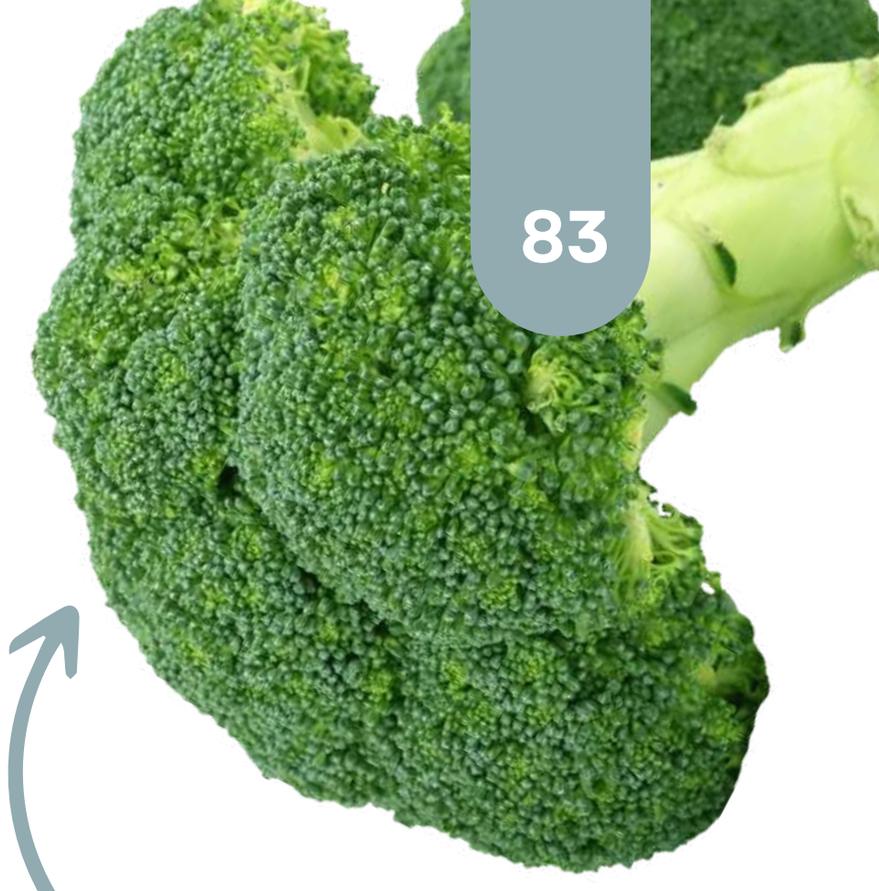
Harvest cauliflower when the heads reach the desired size and firmness. It can be used **fresh** or **stored** in the refrigerator or freezer for later use.

GROWING CAULIFLOWER NOT ONLY HELPS STUDENTS DEVELOP GARDENING SKILLS, BUT ALSO OFFERS OPPORTUNITIES TO LEARN ABOUT FERTILIZATION, NUTRIENTS ESSENTIAL FOR PLANT GROWTH, CROP ROTATION, AND THE IMPORTANCE OF LOCALLY GROWN FOOD.

15.1.5

Broccoli

Broccoli is rich in vitamins, minerals, and antioxidants, and it is also very low in calories, making it one of the healthiest vegetables.



Broccoli requires regular watering, and it can be additionally fertilized with potassium and nitrogen.

For optimal growth, it needs a **sunny and sheltered location** with fertile, nutrient-rich soil. Before planting, it is recommended to enrich the soil with **organic fertilizer** or compost, which promotes better growth and a higher yield.

Sow broccoli in **spring** or **autumn**, as it thrives best in moderate temperatures. You can transplant it outdoors in May, spacing the plants **50–60 cm** apart to allow enough room for the main flower head and side shoots to develop.

During the growing season, it is beneficial to **remove side shoots** to encourage the growth of the main flower head.

Broccoli grows well alongside potatoes, peas, and lettuce. Crop rotation is highly recommended to ensure healthy growth and to prevent diseases.

Harvest broccoli when the **heads are firm**, usually 2–3 months after transplanting. You can use it **fresh**, or **store** it in the refrigerator or freezer for later use.

BROCCOLI IS AN IDEAL VEGETABLE TO TEACH STUDENTS ABOUT EDIBLE PARTS, HELPING TO REDUCE FOOD WASTE. NOT ONLY THE HEAD BUT ALSO THE STEM AND LEAVES ARE EDIBLE, HIGHLY NUTRITIOUS, AND FLAVORFUL, AND CAN BE USED IN SOUPS, SAUCES, OR MAIN DISHES.

15.1.6

Spinach and chard

Spinach and chard are nutrient-rich leafy vegetables that are extremely popular due to their high content of vitamins, minerals, and fiber. Spinach is known for its high iron content, while Swiss chard is rich in vitamins A, K, and C.

in an urban school garden, both crops offer teachers and students the opportunity to observe rapid growth and easy harvesting.

Both thrive best in **fertile, loose, and well-drained soil** enriched with compost. They prefer slightly **shaded** areas, although chard can tolerate more sun.

When sowing, it's important to know that **spinach tends to bolt quickly** in higher temperatures, so it should be sown in a partially shaded part of the garden. Sow it in rows with **20 cm spacing** between them, and at a depth of about 2.5 cm. For a continuous fresh supply, you can **sow spinach every 14 days**.

Chard (or Swiss chard) should be sown in **spring**, with **30–40 cm** between plants and a depth of **2 cm**.

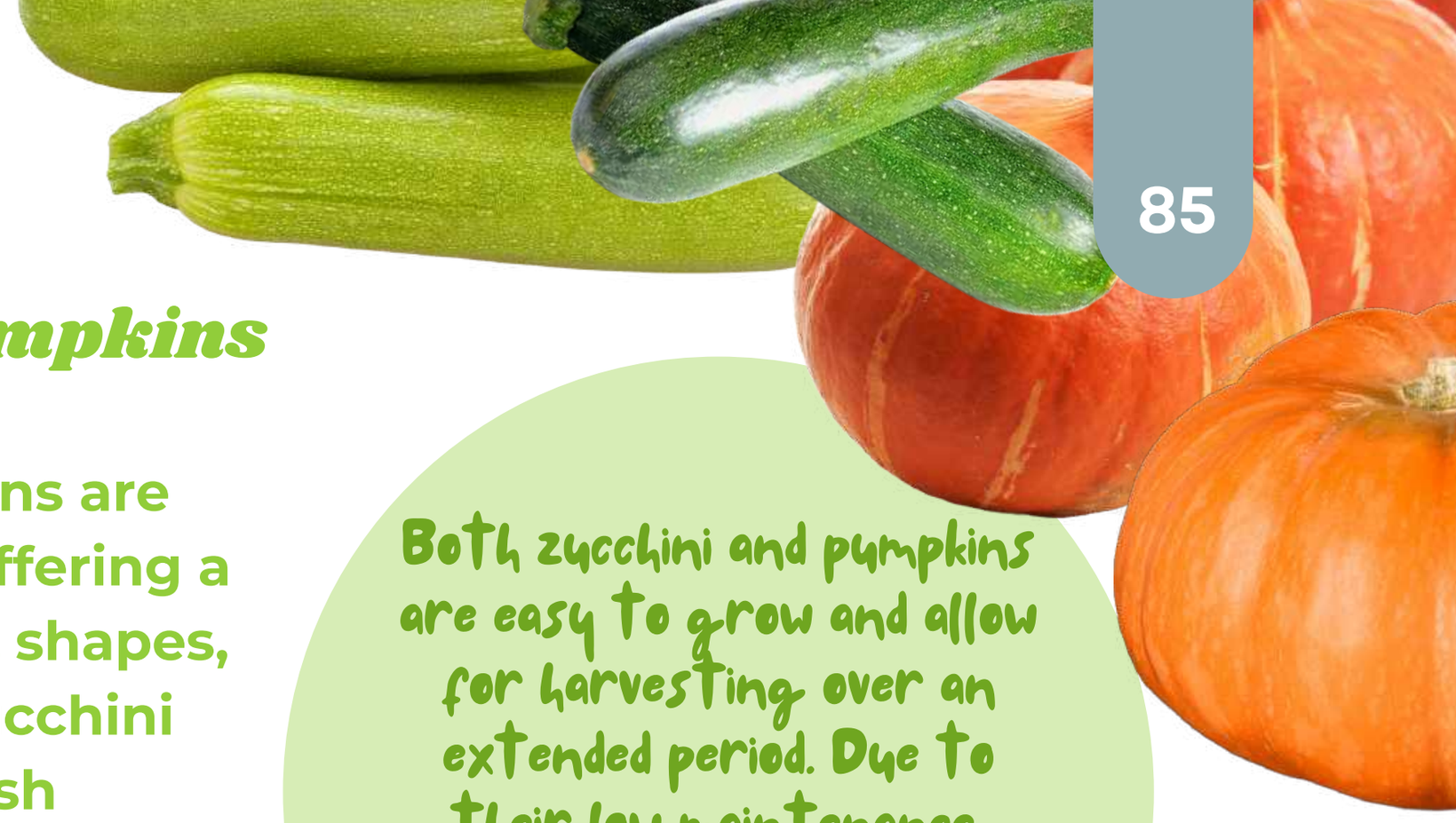
Both crops require **minimal care**, but **regular watering** is **essential**, especially during dry periods. Occasional fertilizing with a nitrogen-rich fertilizer is also recommended to promote leaf growth.

They grow well alongside carrots, radishes, and beans–but not with each other. Choose disease- and pest-resistant varieties, and pay special attention to downy mildew on spinach. **Crop rotation** is advisable.

Harvest spinach gradually, once it reaches a suitable size. You can cut outer leaves or harvest the whole plant. **Chard leaves** are ready to harvest about **8–12 weeks after sowing**. Start by cutting the outer leaves and allow the plant to keep growing.

Harvested leaves of both plants can be used **fresh** or **stored** in the refrigerator or freezer.

SPINACH AND CHARD OFFER NUMEROUS EDUCATIONAL OPPORTUNITIES IN THE SCHOOL GARDEN, ALLOWING STUDENTS TO LEARN ABOUT THE GROWTH CYCLE, PLANT CARE, AND THE IMPORTANCE OF LOCAL, HEALTHY FOOD.



15.1.7

Zucchini and pumpkins

Zucchini and pumpkins are popular vegetables offering a wide variety of types, shapes, and flavors. Young zucchini fruits are ideal for fresh dishes, while autumn pumpkins provide a wealth of nutrients and can be used for various activities, such as drying pumpkin seeds or carving pumpkins.

Both zucchini and pumpkins are easy to grow and allow for harvesting over an extended period. Due to their low maintenance, they are ideal for cultivation in an urban school garden.

There are **three main groups of zucchini**, distinguished by the shape of their fruits. These include: **Cucchini zucchini**, with elongated fruits (the most common varieties are 'Zuboda' with dark green fruits and 'Alberello' with light green fruits with dark streaks), **Round zucchini**, and **Pattypan squash**, with flower-like shaped fruits.

Among **pumpkins**, the most well-known varieties are: **Butternut squash** (a delicious winter variety with an orange interior), **Hokkaido pumpkin** (a winter variety with a sweet flavor and orange skin), and **Spaghetti squash**, which, when cooked, separates into strands resembling spaghetti.

Both zucchini and pumpkins **thrive in sunny and warm locations** with humus-rich, well-fertilized, and moist soil. For optimal growth, it is necessary to enrich the soil with **compost** and **manure**, providing the plants with a healthy growing environment. The soil should be well-drained, as pumpkins do not tolerate water retention.

Plant zucchini and pumpkins outdoors when the **soil temperature** reaches at least **15 degrees Celsius**, which typically occurs in May. In a protected environment, they can be sown as early as April and then transplanted to the bed in May.

Place the **zucchini seeds about 1–2 cm deep** into the soil. **Bush** varieties should be planted with a spacing of **50–80 cm**, while **climbing** varieties require more space, so plant them with a spacing of up to **2 m**.

It is recommended to **mulch the soil** around zucchinis and pumpkins to retain moisture and suppress weed growth. For bush varieties, remove the first lateral shoots to encourage the growth of the main fruits.

During dry periods, the plants need **regular watering** to prevent dehydration.

To increase the number of female flowers, which produce fruit, you can remove some of the male flowers if there are too many. Also, **regularly remove any dead leaves and fruits**.

Zucchini and pumpkins grow well alongside onions, beans, spinach, and tomatoes, but they do not thrive near potatoes.

Harvest zucchini regularly while they are still young and have soft skin–this will also encourage continued flowering and fruiting. **Winter pumpkins** should be harvested in **late autumn**, before the first frost. They can be **stored** in a cool place, where they will remain fresh until spring.

Zucchini and pumpkins offer many opportunities to involve students in all phases of cultivation—from sowing to harvesting and preparing delicious meals—helping them gain valuable knowledge about sustainable gardening and healthy eating.

ONE ENGAGING ACTIVITY IS THE CREATION OF POSTERS OR IDENTIFICATION CARDS, WHERE STUDENTS PRESENT DIFFERENT VARIETIES OF ZUCCHINI OR PUMPKINS, THEIR MAIN CHARACTERISTICS, CARE INSTRUCTIONS, AND HEALTH BENEFITS.

15.1.8

Lettuce

Lettuce is one of the most common vegetables. It is popular among gardeners due to its low maintenance, crunchy taste, and positive health effects, making it an ideal choice for growing in an urban school garden.

Based on the growth and harvesting method, **lettuces** are divided into **three types**: **head lettuce**, where the plant forms a head that is cut off during harvesting, **leaf lettuce**, where young leaves are cut as needed, and **rosette lettuce**, which forms a rosette that can be either harvested entirely or partially cut, depending on the variety.

Lettuce does not require much space to grow.

Lettuce can be **sown from early spring to late autumn**. Sow the seeds in shallow planting furrows, lightly cover them with soil, and water. To achieve optimal growth density and provide space for plant development, it is highly recommended to **thin the seedlings**.

During hot and dry periods, **water the lettuce regularly**. To prevent aphids, practice crop rotation and choose resistant varieties. To protect against **slugs**, scatter gravel or sand around the plants, or use protective nets.

Lettuce is best **harvested progressively**, as this allows new leaves to grow. Soft-leaved varieties can be cut **multiple times**, while more compact head lettuces are harvested **once**.

DUE TO ITS RAPID GROWTH, LETTUCE IS VERY POPULAR AMONG STUDENTS, AS THEY CAN QUICKLY SEE THE RESULTS OF THEIR WORK. MOREOVER, IT DOES NOT REQUIRE MUCH SPACE, MAKING IT SUITABLE FOR SMALL GARDENS IN THE CITY CENTER.

15.1.8.1

Corn salad

Corn salad or **Lamb's lettuce** is a popular salad green, and its cultivation involves sowing seeds on an **open surface**, lightly covered with soil. If sowing in pots, place two seeds in each pot. Corn salad is sown in **August or late summer** when temperatures start to drop.

It is quite **low-maintenance** but requires regular watering and protection from slugs. To harvest the leaves, cut them without removing the entire plant, allowing it to regrow.

As a vegetable in an urban school garden, corn salad is an excellent choice for those who want to garden in the autumn as well.

15.1.9

Onions and shallots

Onions have been an essential ingredient in every kitchen for thousands of years. They are even mentioned in Egyptian hieroglyphs, as the pyramid builders were reportedly partly paid with onions. Onions are versatile and can be used raw, baked, sautéed, in salads, and in soups. Shallots are smaller and have a milder flavor, yet they are equally useful in many recipes.

Neither onions nor shallots require particularly rich soil. They thrive in **loose, well-drained soil** that allows good aeration of the root system. Adding compost or light **organic fertilizer** can improve soil structure, as stagnant water may cause rotting.

When growing plants with students, consider which method to use. it is recommended that younger students plant onion sets, while older students try growing from seeds.

Onions can be grown from seeds or sets. Start sowing seeds in **February or March** in pots or under cover. Once the seedlings have strengthened, they can be transplanted outdoors, usually in April or May. For **spring** planting with sets, choose **smaller onions** and plant them in rows with a spacing of **10 cm**, as **smaller** onions mature more quickly. In the **fall**, plant **larger** sets to harvest the following year.

Shallots can be planted in **spring or autumn**, but note that they grow more slowly than onions. Plant them in rows spaced **15 cm apart**, with a distance of about **30 cm** between rows. When planting, gently push the bulb into the soil so that the tip remains level with the soil surface. Shallots can also be grown from seeds, which is a challenging but interesting method. Sow in pots in February or March. Once the seedlings have grown and are strong enough, **carefully transplant** them into the bed, taking care not to damage the plants to ensure continued growth.

Onions and shallots require **regular watering**, especially during dry periods and in the early stages of growth. It is also advisable to **mulch** the soil around the plants, as this helps retain moisture and suppress weeds.

They grow well in **mixed crops** with plants such as zucchini, beetroot, celery, and lettuce. However, avoid planting them near beans, peas, broccoli, or cabbage.

Harvest onions when the leaves begin to wilt and dry out, as this indicates that the bulbs are mature. Pull them gently from the soil by hand and leave them to dry in the sun. Once dry, **store** them in a cool, **dark place**.

Shallots are usually **harvested** in **late summer or autumn**. They can be stored in a **cool, dry area** where they will remain usable for several months.

Although both types are **relatively easy to grow**, some issues may arise during their development. Yellowing leaves may indicate a lack of water or disease, orange-brown spots on the leaves can be a sign of fungal infection, and young plants that stop growing may be affected by the onion fly. Protect seedlings with row covers to prevent damage.

STUDENTS SHOULD TAKE PART IN PREPARING THE SOIL, ADDING COMPOST, AND SOWING SEEDS OR PLANTING SETS. THROUGH THIS PROCESS, THEY WILL LEARN THE IMPORTANCE OF PROPER SOIL PREPARATION AND PLANTING TECHNIQUES. WHEN THE CROP IS READY, INVOLVE STUDENTS IN THE HARVESTING PROCESS. ONIONS AND SHALLOTS ALSO PROVIDE AN OPPORTUNITY TO TEACH STUDENTS HOW TO STORE FOOD FOR LONGER PERIODS.

15.1.10

Beans

Beans are a popular legume, rich in protein, fiber, and vitamins. They thrive in sunny locations with well-drained, slightly acidic to neutral soil.

Beans are an ideal crop for a school garden because they are low-maintenance and grow quickly, allowing students to observe the entire life cycle of a plant — from seed to pod.

Enrich the soil with **compost** or **organic fertilizer** before planting. Sow beans **directly outdoors** when the **soil is warm** enough (usually in late spring, when temperatures exceed 10°C / 50°F). Space the rows 30–40 cm apart, with 10 cm between each plant.

Pole beans require **support**, such as sticks or trellises, while bush beans grow without additional support.

Beans are **easy to care for** but require **regular watering**, especially during flowering and fruit development. In dry periods, keep the soil moist to prevent drying out. **Mulching** is also recommended to retain moisture and reduce weed growth.

Beans have the unique **ability to fix nitrogen from the air into the soil**, which improves soil fertility and makes them especially valuable in crop rotation.

Harvest beans gradually once the pods have reached full size but are still tender. Frequent harvesting **encourages** the development of new flowers and pods. For **dry beans**, leave the pods on the plant until they are fully dry, then collect and **store** them for winter.

In the garden, beans grow well alongside potatoes, cucumbers, lettuce, and radishes, as their root systems and nutrient needs complement each other. Avoid planting them near onions, garlic, or leeks.

Beans grow very quickly and provide students with insight into the complete growth cycle of a plant.

YOU CAN EVEN GROW BEAN SEEDLINGS IN THE CLASSROOM IN JUST A FEW DAYS. ALL YOU NEED ARE BEAN SEEDS, PAPER TOWELS, WATER, AND JARS. EACH STUDENT SHOULD RECEIVE A SEED, A PAPER TOWEL, AND A JAR. THEY POUR A SMALL AMOUNT OF WATER INTO THE JAR (JUST ENOUGH TO COVER THE BOTTOM), INSERT THE PAPER TOWEL, AND PLACE THE SEED ON TOP. THE SEED WILL BEGIN TO SPROUT THE VERY SAME DAY. STUDENTS CAN THEN OBSERVE AND RECORD THE CHANGES IN THE BEAN'S GROWTH EACH DAY.

15.2

Fruit

Growing fruit in an urban school garden provides teachers and students with numerous opportunities to **learn about gardening and food self-sufficiency**.

Students can learn about **the entire process of fruit production**, developing patience, responsibility, and basic gardening skills through practical activities.

In addition, fruit trees and shrubs **improve air quality** and increase **biodiversity** by providing habitats for various animals.

Freshly picked fruit encourages students to enjoy healthy, locally grown food.

BY GROWING FRUIT, STUDENTS ALSO LEARN THAT FRUIT DOES NOT ALWAYS HAVE THE PERFECT SHAPE, YET IT REMAINS DELICIOUS AND HEALTHY. THIS AWARENESS HELPS STUDENTS BECOME MORE RESPONSIBLE AND SUSTAINABILITY-ORIENTED CONSUMERS.

15.2.1

Strawberries

Strawberries are a very tasty fruit that require little space to grow, making them ideal for cultivation in school gardens located in urban areas.

They thrive in containers, raised beds, hanging baskets, and even flower pots.

Before planting strawberries, it is recommended to **thoroughly prepare the garden bed** by loosening the soil and adding compost or organic fertilizer.

Plant strawberry seedlings **20–30 cm apart** to give them room to spread. They can also be planted in **pots** or **containers**, which is suitable for smaller school gardens or classroom-based learning.

Strawberries grow best in **sunny and sheltered locations**, where they are protected from excess moisture and strong winds. To keep the plants healthy, they should be **watered regularly** and kept dry at the base to avoid rot.

For greater resistance and diversity in the garden, teachers and their students can **grow different varieties of strawberries**.

With proper care, you **can harvest** fruit **from early spring to autumn**.

Strawberries naturally **propagate through runners**. When the parent plant produces new shoots, you can carefully cut them off and plant them in smaller pots to develop roots. Once the young plants have established themselves, they can be transplanted back into the garden bed.

An important part of growing strawberries is **protecting the fruit**. One option is to use mulch, which keeps the soil moist and prevents the fruit from coming into contact with the ground. You can also protect strawberries from birds and insects by covering them with a **net**.

Regular watering and **removal** of old and damaged **leaves** are essential for healthy strawberry plants.

STRAWBERRIES ARE VERSATILE. STUDENTS CAN ENJOY THEM FRESH RIGHT AFTER PICKING OR USE THEM TO MAKE FRUIT SALADS, SMOOTHIES, JAMS, AND VARIOUS DESSERTS. THEY CAN ALSO BE FROZEN AND ENJOYED THROUGHOUT THE YEAR.

Growing strawberries in an urban school garden provides students with hands-on experience in cultivating their own fruit and fosters an awareness that hard work in the garden is rewarded with a sweet and healthy harvest.

15.2.2

Blueberries

Blueberries are hardy and easy to grow, and they tolerate moist and acidic soils well, making them suitable for cultivation even in urban city gardens.

Blueberries are rich in vitamins and antioxidants, and their consumption contributes to a healthy lifestyle.

It is advisable to **check the soil pH** before planting (the ideal value for blueberry growth is between 3.5 and 5.2). If the soil is not acidic enough, you can add a mixture of peat or a **special fertilizer**.

It is also recommended to plant blueberries in **larger containers or raised beds**. Dig a larger hole, fill it with a mixture of acidic soil, and plant the bushes so that the roots are well spread out. Then water the plants and cover the soil with mulch to help retain moisture and prevent weed growth.

Water the blueberries regularly, especially during dry periods, as they require consistently **moist soil** for optimal growth.

It is advisable to **prune** the plants early in the spring, removing old and damaged branches to **encourage the growth** of new shoots.

Blueberry berries **ripen in mid-summer**, turning a **deep blue color**. Harvest the blueberries **gradually**, as not all fruits ripen at the same time. Ripe blueberries come off the bush easily, but be careful not to damage them, as they can quickly start to rot.

Fresh blueberries are great for eating, but they can also be frozen, dried, or processed into jams and juices.

Picking sweet berries can also be a good motivation for all the students on duty who take care of the garden during the holidays.

INVOLVE STUDENTS IN THE ENTIRE GROWING PROCESS, FROM SOIL PREPARATION AND PLANTING TO HARVESTING FRUITS. TEACHERS SHOULD ENCOURAGE STUDENTS TO CHECK THE SOIL PH, WHICH PROVIDES AN IDEAL STARTING POINT FOR LEARNING ABOUT DIFFERENT SOIL TYPES AND PROPERTIES, INCLUDING ACIDITY AND ALKALINITY.

15.2.3

Raspberries

Raspberries are a popular berry that produce delicious, juicy fruits. Different varieties allow you to grow raspberries that bear fruit once a year (in summer) or twice a year (in summer and autumn).

Raspberries need plenty of sunlight and well-drained, nutrient-rich soil, which is recommended to be enriched with fertilizer before planting.

In the garden, they can be grown **independently or with support**, which some varieties require due to the height of the plants and the weight of the fruits.

Raspberries can be planted in **autumn or early spring** when the soil is warm enough. To plant, prepare a **trench** about 25 cm deep and 45 cm wide, into which you spread fertilizer (compost or manure), then cover it with the previously dug soil. Dig the soil back approximately 15–20 cm, then plant the seedlings in a row at a distance of 45 cm. If planting in groups, leave about 1.5–1.8 m between the rows.

It is important that the plants receive **plenty of sunlight**. Raspberries thrive in well-tilled and fertile soil. They need **regular watering**, especially during dry periods. It is essential to **mulch** around the plants, as mulch helps retain moisture and suppresses weed growth. Occasionally, the plants need to be **pruned**.

After harvesting, **remove old canes** to make room for new ones and encourage the growth of young shoots.

The fruits are **ripe** when they take on their **characteristic color** and **easily detach** from the stem. It is best to pick them in **dry weather**, as this helps the berries remain firm for a longer period. Raspberry fruits are **quite delicate** and should be consumed quickly or frozen for later use.

TEACHERS SHOULD INVOLVE STUDENTS IN DIFFERENT STAGES OF RASPBERRY CULTIVATION. THEY SHOULD PARTICIPATE IN SOIL PREPARATION, SUPPORT INSTALLATION, PLANTING, AND HARVESTING. DURING THE HARVEST, STUDENTS CAN HELP WITH PICKING WHILE LEARNING HOW TO HANDLE THE DELICATE FRUITS PROPERLY.

15.3

Herbs

Growing herbs in an urban school garden brings numerous opportunities for both teachers and students.

HERBS OFFER A RICH SENSORY EXPERIENCE, AS THEIR SCENT, TASTE, AND APPEARANCE STIMULATE STUDENTS' SENSES AND CONNECT THEM WITH NATURE.

Teachers can use herbs as an educational tool to demonstrate the use of plants in everyday life, from culinary applications to medicinal uses.

Additionally, most herbs are **low-maintenance** in terms of cultivation and care, as they do not require much space, fertilizers, or water.

If planted **among vegetables**, herbs can **repel pests** through the evaporation of essential oils, **prevent diseases**, and even **purify** the surrounding **urban air**.

Herbs and their flowers also **attract pollinators** such as bees and butterflies, which supports **biodiversity**.

Moreover, their pleasant scent and attractive appearance contribute to a **welcoming atmosphere** in the school garden.

15.3.1

Basil

Basil is a fragrant annual herb native to Asia, widely popular in culinary use, especially in Italian cuisine. It is also utilized in herbal medicine and as a garden decoration.

There are **various types of basil** that differ in leaf size, color, and aroma intensity (such as purple basil - Purpurascens, lemon basil - Citriodorum, and Greek basil - Minimum).

FOR SUCCESSFUL GROWTH, BASIL REQUIRES POTS AT LEAST 15 CM DEEP OR A SPOT IN THE GARDEN BED WITH RICH GARDEN SOIL. ADDING SOME SAND CAN IMPROVE DRAINAGE.

Optimal location is **sunny** and **sheltered**, as basil does not tolerate cold wind. You can **sow** it indoors as early as **February**. Sow the seeds sparsely and gently press them into the substrate or soil, as they **need light** to germinate.

When the first shoots appear, move the plants to a cooler place. Once the risk of frost has passed (mid-May), you can **transplant basil outdoors** (in a bed or container). Leave a distance of **10 cm** between seedlings to allow the plants to spread out.

For successful growth, **regular watering** is essential, but avoid overwatering as basil does not thrive in overly wet soil. On hot days, water **early in the morning**. To prevent flowering, **regularly pinch off the tops**, which will encourage the growth of side shoots.

BASIL LEAVES ARE MOST AROMATIC WHEN FRESH, AND CONTAIN THE MOST ESSENTIAL OILS IN THE MORNING. USE THE LEAVES TO ENRICH SCHOOL SNACKS, OR FREEZE THEM OR PRESERVE THEM IN OLIVE OIL, AS DRYING REDUCES THEIR AROMA.

Basil is **sensitive to low temperatures**, so move it indoors in the autumn. You can cut it and use the leaves until the plant starts to wilt. Use the plant remains for **compost**.

Involve students in all stages of basil cultivation, from sowing to harvesting leaves and using them in various dishes.

15.3.2

Parsley

Parsley is a popular biennial plant primarily grown for its aromatic leaves, rich in vitamins and minerals. There are varieties with smooth and curly leaves, differing in taste and use.

Parsley requires regular watering as it prefers moist soil.

Parsley holds an important place in **culinary** practices as it complements the flavor of many dishes, while fresh leaves can also serve as plate decoration.

For successful growth, parsley needs a **pot at least 20 cm deep**, filled with a substrate rich in compost, or light, moist soil, rich in humus.

It thrives best in a **partially shaded location** but can also tolerate sunny spots. Fertilization is usually not necessary as the plant does not require many nutrients.

Sow parsley in **early spring**, as germination takes a long time. Sow the seeds as sparsely as possible, lightly cover them with soil, and maintain moisture regularly. Outdoors, you can sow from **March** onwards; for an earlier harvest, sow indoors as early as **February** and transplant later.

IN THE FIRST YEAR, IT DEVELOPS LEAVES, WHILE IN THE SECOND YEAR, IT FORMS FLOWER STEMS AND SEEDS.

When the **leaves** reach a size of **7–10 cm**, you can **start harvesting**. Pick the outer leaves to encourage the growth of new shoots. The leaves are **best used fresh**, so harvest as needed. To preserve the most aroma, add them to dishes just before serving. You can also freeze the leaves or store them in olive oil for year-round use.

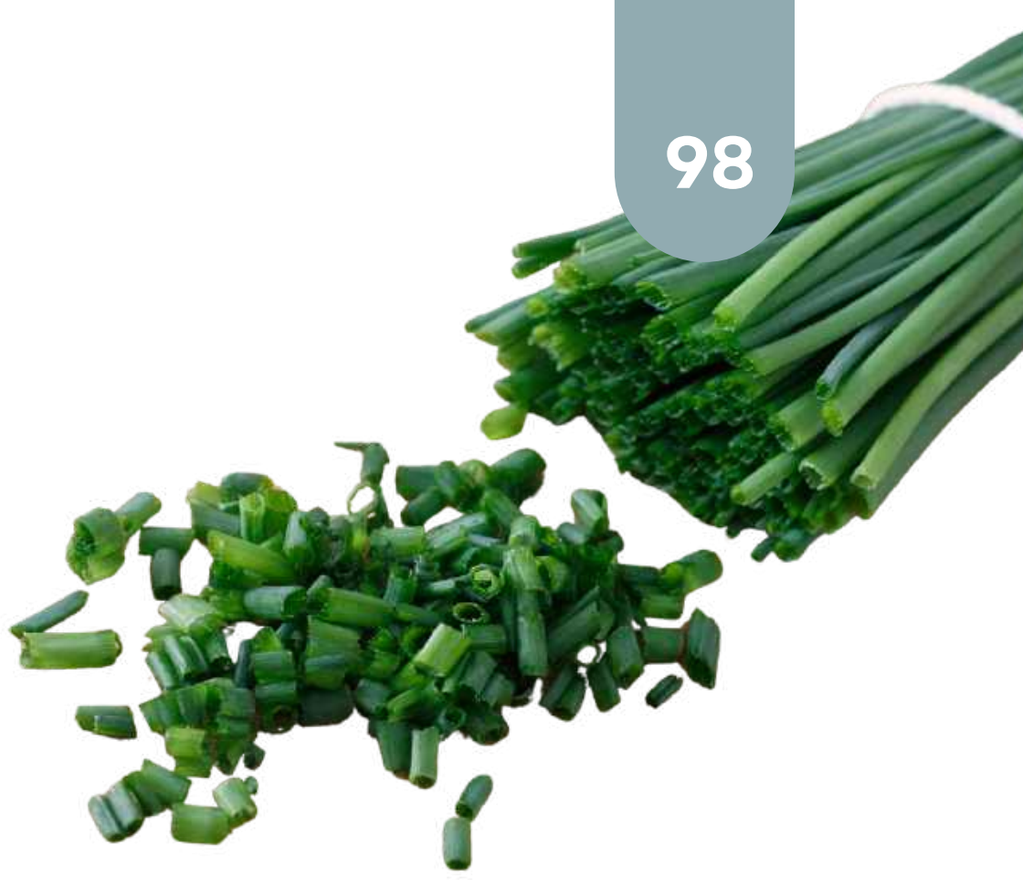
Since parsley is a **biennial**, you can move it to an indoor windowsill before winter to protect it from frost. Plants that survive the winter will produce flowers and seeds the following year.

INVOLVE STUDENTS IN ALL STAGES OF PARSLEY CULTIVATION. GROWING PARSLEY ALLOWS YOU TO OBSERVE THE TWO-YEAR DEVELOPMENT OF THE PLANT AND COMPARE IT WITH ANNUAL CROPS.

15.3.3

Chives

Chives are a perennial herb from the allium family, producing attractive purple flowers and aromatic green leaves resembling small tubular stems. Known for their mild taste reminiscent of onions, they are much milder.



DUE TO THEIR APPEAL TO BEES AND OTHER POLLINATORS, CHIVES ARE A VALUABLE ADDITION TO ANY GARDEN, ATTRACTING NUMEROUS INSECTS AND ENHANCING THE GARDEN'S BIODIVERSITY.

Chives thrive best in a **pot at least 10 cm deep**, filled with substrate and compost, or along **garden bed edges**, as they spread nicely and form a natural border.

They require a **sunny or partially shaded spot**. It is essential to avoid planting seedlings too densely, as this can quickly lead to rust.

Sow chives in pots **early in the spring** in a sheltered spot at a temperature of at least **20 °C**. Once the risk of frost has passed, transplant them outdoors. You can also sow them **directly outdoors**, where they will germinate under suitable conditions.

Chives require **regular**, but not overly frequent, **watering**.

When the **leaves** reach a height of approximately **15 cm**, you can **start trimming** them to about 3 cm above the ground.

In summer, **remove flower buds** to encourage leaf growth, but towards the end of the summer, allow some flowers to mature and produce seeds. Chive leaves **taste best when fresh**. For long-term storage, you can **freeze** or **dry** them, and use the flowers for **decoration**.

Before winter, **cut** back the chives and leave them outdoors, or move them indoors to a windowsill where they will be protected from the cold. In the spring, they will sprout fresh green leaves again.

GROWING CHIVES OFFERS TEACHERS AND STUDENTS VARIOUS OPPORTUNITIES. STUDENTS CAN OBSERVE HOW CHIVES ATTRACT BEES AND OTHER POLLINATORS, LEARNING ABOUT THE IMPORTANCE OF BIODIVERSITY IN THE CITY.

Chives can also be used in salads, soups, or spreads.

15.3.4

Thyme

Thyme is a small evergreen herb with highly aromatic leaves. It originates from the Mediterranean region, where it is valued for its distinct aroma and medicinal properties.

in addition to caring for the plant, you can introduce students to its medicinal benefits. Thyme aids digestion and helps alleviate coughs.

THYME GROWS BEST IN A POT AT LEAST 15 CM DEEP, FILLED WITH A NUTRIENT-POOR SUBSTRATE WITH A HIGH SAND CONTENT.

It requires a very **sunny and warm spot**, where it will get plenty of light for optimal growth. You can also sow it directly in the garden, bearing in mind that thyme prefers **dry**, well-drained **soil**.

You can **plant** thyme in pots or outdoors in **April**. It also does well along path edges and even between paving stones.

You can propagate thyme from **cuttings** or by **dividing an existing plant**. Seeds can also be sown directly outdoors, where they will germinate when conditions are suitable.

Water sparingly, as thyme does not like excessive moisture. Let the soil dry out between watering sessions.

Start harvesting shoots in **June**, which will encourage the growth of side shoots and keep the plant compact. **Twice a year**, you can **cut** the plant down to 10 cm above the ground and dry the stems.

Harvest thyme leaves as needed. To store them, you can **dry** or **freeze** them. Whole shoots and tips can also be preserved in oil.

In autumn, leave the plant untrimmed, as dry branches provide protection from frost. In spring, prune the plant, being careful not to damage new shoots.

THYME PROVIDES AN IDEAL OPPORTUNITY TO DEMONSTRATE TO STUDENTS THE PRACTICAL ASPECT OF PLANT PROPAGATION USING CUTTINGS.

15.3.5

Rosemary

Rosemary is a bushy, evergreen Mediterranean plant, popular for its strong aroma and numerous beneficial properties.

IT HAS NARROW, DARK GREEN LEAVES THAT ARE HIGHLY AROMATIC AND WIDELY USED IN COOKING, ESPECIALLY FOR SEASONING MEAT, POTATOES, AND SAUCES.

Rosemary thrives best in a **pot at least 20 cm deep**, filled with **loamy soil** mixed with sand for good drainage, or in well-drained soil with some sand.

It requires a **sheltered and sunny location**, as warmth will help it grow and stay healthy.

Plant rosemary **using seedlings** (purchased or propagated) in **May**, or propagate it from **cuttings** in **spring**. Make sure the plant has enough space to spread out when planting.

For optimal growth, **prune rosemary regularly**. **Pick the tips** throughout the year, which will encourage the plant to grow bushier. You can dry and store the trimmed tips. Be careful not to cut too low into the woody part of the stem, as rosemary has difficulty sprouting from there.

Rosemary **leaves are most aromatic when fresh**, but they can also be dried and stored for later use. Harvest them **as needed** throughout the year, but take care not to damage the woody parts.

Rosemary is **sensitive to low temperatures**, so before winter, move it to a bright place where temperatures stay around 10 °C.

ROSEMARY IS AN EASY-TO-MAINTAIN PLANT THAT OFFERS MANY LEARNING OPPORTUNITIES. STUDENTS CAN OBSERVE HOW ROSEMARY RETAINS ITS LEAVES THROUGHOUT THE YEAR, LEARN ABOUT EVERGREEN PLANTS, AND UNDERSTAND HOW PLANTS ADAPT TO ENVIRONMENTAL CONDITIONS. IT ALSO GIVES STUDENTS A CHANCE TO PRACTICE PRUNING AND REFLECT ON HOW PRUNING AFFECTS BUSHY GROWTH.

15.3.6

Oregano

Oregano is a perennial herb with distinctive small leaves that develop a strong aroma. In the garden, it attracts bees and butterflies, contributing to the preservation of biodiversity in urban environments.

Due to its intense scent and flavor, it is an essential ingredient in Mediterranean cuisine.

Oregano thrives best in a **pot at least 30 cm deep**, filled with a substrate enriched with clay and some sand for better drainage, or in **dry, sandy, or loamy soil** in the **garden**.

IT PREFERS A SUNNY LOCATION, AS IT LOSES ITS AROMA AND STRONG SCENT IN SHADED AND OVERLY MOIST CONDITIONS.

Plant seedlings (purchased or propagated from existing plants) in **April**.

Start harvesting oregano leaves and shoots in **July**. Pick them **as needed** and for storage, tying the shoots into bunches and drying them in a warm, dry place. Leave a few shoots to flower. You can also collect seeds for future sowing.

Harvest leaves and shoots **just before the flowers bloom**, as they have the **strongest aroma** at that time. **Dry** or **freeze** them, and you can also use the aromatic flower tips for preserving in oil or vinegar.

Oregano is a **hardy plant** that easily **survives winter** outdoors. Before winter, cut the plants back to a height of 6 cm. To **protect** them from low temperatures, you can cover the plants with spruce branches or straw. In spring, remove dried twigs to encourage the growth of new shoots.

GROWING OREGANO OFFERS STUDENTS MANY LEARNING OPPORTUNITIES. YOU CAN USE OREGANO WHEN PREPARING ITALIAN DISHES SUCH AS PASTA AND PIZZA, OR DRY AND STORE IT FOR LATER USE. IN THE GARDEN, OREGANO ALSO PROVIDES STUDENTS WITH A CHANCE TO OBSERVE ANIMALS IN A NATURAL SETTING, AS ITS AROMA AND FLOWERS ATTRACT POLLINATORS.

15.3.7

Chamomile

Chamomile, especially Roman chamomile (Chamaemelum nobile), is a popular herb with daisy-like flowers. It has a distinctive pineapple scent and is highly valued for its calming and anti-inflammatory medicinal properties.

CHAMOMILE FLOWERS ARE OFTEN USED TO MAKE TEA, WHICH HELPS WITH RELAXATION, DIGESTIVE ISSUES, AND INSOMNIA.

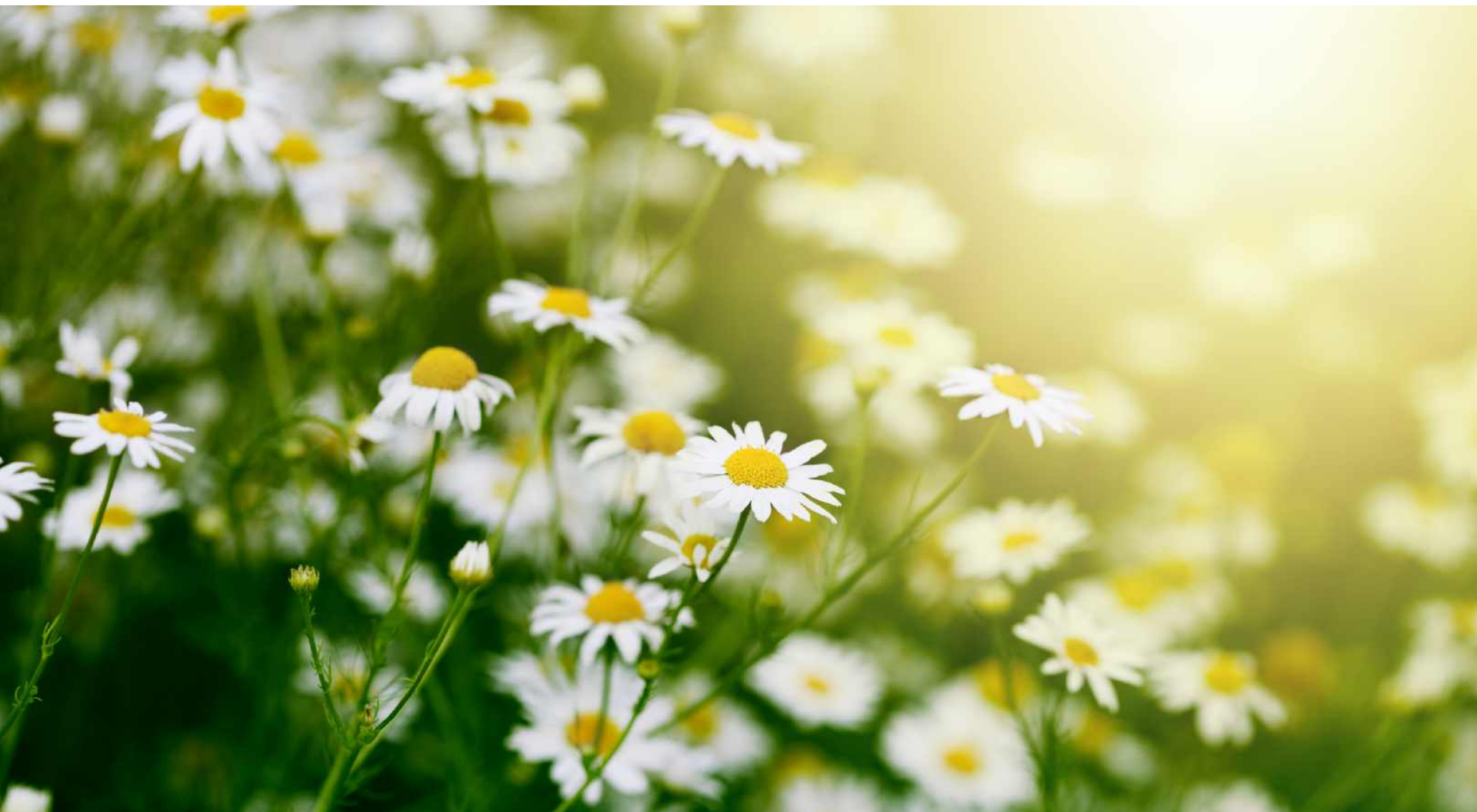
You can sow chamomile from mid-spring onwards, either directly into the ground in the garden or in medium-sized pots and containers.

Chamomile thrives best in slightly moist, well-drained soil in a sunny location and can grow up to 30 cm in height.

Harvest the flowers continuously (from June to August) when they are fully open, as they contain the highest levels of active ingredients at that time. You can dry the flowers and store them in a dark, dry place.

IN ADDITION TO TEACHING STUDENTS ABOUT THE MEDICINAL EFFECTS OF CHAMOMILE ON THE HUMAN BODY, INTRODUCE THEM TO THE PREPARATION OF AN ECO-FRIENDLY SPRAY TO PROTECT PLANTS FROM FUNGAL DISEASES:

Soak a handful of dried flowers in one liter of water, let it stand for 24 hours, strain, and use the liquid to spray plants.



15.3.8

Lavender

Lavender is an evergreen shrub originating from the Mediterranean region. Among the most popular varieties are common lavender (Lavandula officinalis), broadleaf lavender (L. spica), and lavandin (L. x intermedia).

LAVENDER HAS A CHARACTERISTIC FRAGRANCE, GRAY-GREEN ELONGATED LEAVES, AND SMALL CLUSTERS OF PURPLE FLOWERS ON LONG STEMS. IT BLOOMS IN SUMMER, TYPICALLY IN JULY AND AUGUST.

For successful growth, lavender **needs plenty of sun and warmth**, so plant it in a sunny spot. The soil should be well-drained, as water retention can cause root rot.

Moderate watering is recommended, approximately twice a week, as slight water deficiency increases the essential oil content in the plant, enhancing its fragrance.

Prune lavender in spring or right after flowering to maintain its compact and dense shape. Be careful not to cut too close to the ground, as this can weaken the plant. Regular pruning twice a year will keep the lavender well-shaped and suitable for planting in small areas or as a border along pathways and resting areas.

Lavender can be propagated **from seeds** or by using green or woody **cuttings**.

It is valued as an **ornamental plant** and also has numerous **medicinal properties**. Lavender acts as a natural sedative, stimulates appetite, aids digestion, and alleviates stomach cramps.

The scent of lavender **repels harmful insects** such as flies, moths, and mosquitoes, and it freshens up indoor spaces.

Dried flowers can be used in bouquets, potpourris, or as **natural air fresheners**.

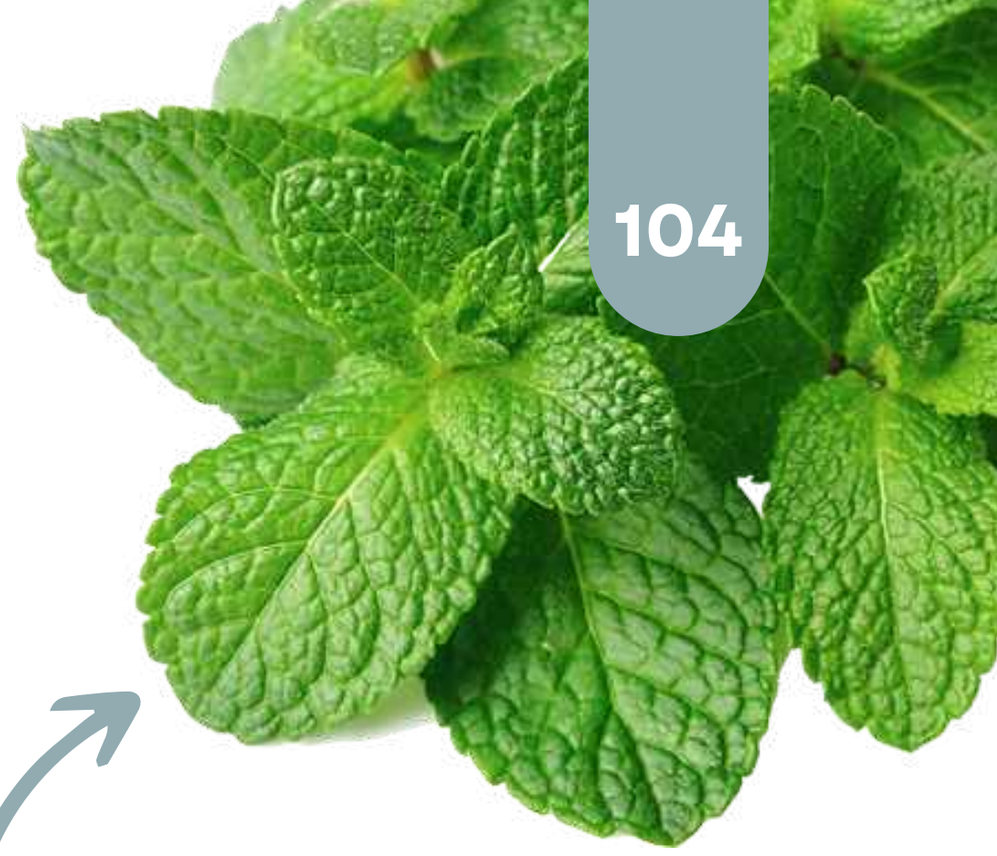
HARVEST LAVENDER FLOWERS JUST BEFORE FULL BLOOM, WHEN THEY CONTAIN THE MOST ESSENTIAL OILS. WITH THE HELP OF STUDENTS, DRY THEM BY TYING THEM INTO SMALL BUNDLES AND HANGING THEM IN A COOL, DRY PLACE. DRIED FLOWERS RETAIN THEIR AROMA AND CAN BE USED TO MAKE SCENTED BAGS OR AIR FRESHENERS.

In an urban school garden, lavender thrives well due to its low maintenance requirements, ability to attract pollinators, repel pests, and its versatile uses.

15.3.9

Mint

Mint is a perennial herb with long, shallow roots and a characteristic fresh scent. There are numerous varieties, such as chocolate, ginger, orange, and pineapple mint, but the most well-known is peppermint (Mentha piperita), which has a strong flavor and refreshing aroma.



Due to its rapid growth and spreading nature, mint can quickly overtake a garden.

Mint leaves are serrated, elongated, and light green, while flowers bloom during the summer months.

For optimal growth, mint requires **well-drained but moist soil** rich in humus. It thrives best in **sunny to partially shaded** locations.

Due to its **invasive nature**, mint is suitable for growing in **pots**. If planting in a garden bed, it is recommended to use a container without a bottom to limit root spread.

Plant mint in May, either by dividing the roots of older plants or using purchased seedlings. It can also be propagated by stem cuttings, which can be cut and rooted during summer. Mint requires **regular watering**, as its shallow roots dry out quickly.

Mint is a **very beneficial plant in the garden** since its scent repels ants, flea beetles, and aphids.

You can **start harvesting** the tips about **a month after planting**, which encourages bushy growth. Before flowering, cut the plant back to a height of 5 cm, and you can dry or freeze the leaves. **Harvest** the leaves **as needed**, using them **fresh or dried**. Store dried leaves in paper bags or jars.

Before winter, cut mint to about 10 cm above the ground. In exposed areas, protect it with a **mulch** of spruce branches or straw. Indoors, it can **overwinter in a pot**.

MINT HAS MANY MEDICINAL PROPERTIES, AS IT HELPS WITH DIGESTIVE ISSUES, HEADACHES, AND COLDS. PEPPERMINT ESSENTIAL OIL IS USED FOR MASSAGES TO ALLEVIATE MUSCLE PAIN AND RHEUMATIC PROBLEMS.

INVOLVE STUDENTS IN ALL STEPS OF MINT CULTIVATION AND EXPLAIN THE PRACTICAL USE OF HERBS. ENHANCE THIS LEARNING BY ENGAGING IN ACTIVITIES SUCH AS PREPARING MINT TEA OR SYRUP AND ADDING MINT TO SMOOTHIES OR DISHES.

15.3.10

Lemon balm

Lemon balm is a pleasant, lemon-scented perennial that attracts bees.

IT THRIVES BEST IN SLIGHTLY MOIST SOIL RICH IN ORGANIC MATTER. PLANT IT IN A SUNNY OR PARTIALLY SHADED LOCATION, AS HEAVY SHADE DOES NOT SUIT IT.

Sow lemon balm **early in the spring** directly into the ground or plant seedlings. Similar to mint, it **spreads rapidly**.

To limit its spread, **sow or plant it in a pot or container**.

Older plants can be **divided and transplanted**. Keep the soil **moist** where it grows. Cut it for the first time when it forms a bushy growth, which will encourage the development of new leaves.

Fresh leaves can be **harvested throughout the year**. They are best when **fresh** but can also be frozen.

Lemon balm can be used to **make tea, syrups, salads, and dishes**. It helps with insomnia and bronchitis.

BY GROWING LEMON BALM, YOU CAN ALSO INTRODUCE STUDENTS TO HERBS AND THEIR VERSATILE USES, FROM ATTRACTING POLLINATORS TO MAKING DELICIOUS LEMON BALM SYRUP.

15.4

Flowers

Growing flowers in an urban school garden brings numerous benefits both to your garden and to the educational process itself.

Flowers **attract bees, butterflies, and other pollinators** with their blossoms, which are essential for the successful growth and production of vegetables, as they facilitate the formation of fruits and seeds.

Moreover, flowers **enhance the biodiversity** of the garden by creating favorable living conditions for beneficial organisms such as ladybugs and birds, which naturally help control pests.

With their vibrant colors and beautiful blooms, flowers also **add aesthetic value** to the garden, encouraging students to participate in gardening activities.

TEACHERS CAN USE FLOWERS AS A TEACHING TOOL DURING REGULAR CLASSES TO EDUCATE STUDENTS ABOUT DIFFERENT TYPES OF FLOWERS, THEIR PARTS, LIFE CYCLES, ROLES IN THE ECOSYSTEM, AND THE CONNECTION BETWEEN ALL LIVING THINGS IN OUR ENVIRONMENT.

In urban settings where natural habitats are often scarce, flowers create living spaces for various creatures, including insects, birds, and lizards, providing them with the essential food and shelter that the city environment alone cannot offer.

15.4.1

Marigold

Marigold is a vibrant flower with bright orange blooms that, besides adding aesthetic value, brings numerous benefits to the urban school garden. It blooms for a long time and is suitable for both ornamental flower beds and the edges of vegetable gardens, as it attracts beneficial insects.

Marigold possesses numerous medicinal properties – it has anti-inflammatory effects, helps with wound healing, and alleviates skin issues.

It thrives best in **sunny or partially shaded areas** and grows in most soil types, preferably well-drained soil. You can **sow** it in the **spring**, either directly outdoors or by growing seedlings.

Students can **use the flowers** to make teas, ointments, or bouquets to brighten up classrooms, hallways, or the cafeteria. Dried flowers can be added to potpourri or used to repel pests.

YOU CAN ALSO PREPARE A NATURAL PLANT IMMUNITY BOOSTER TOGETHER:

YOU WILL NEED A CONTAINER, 1 LITER OF RAINWATER OR SETTLED WATER, AND 100 GRAMS OF MARIGOLD. CHOP THE MARIGOLD PARTS INTO SMALL PIECES AND ADD THEM TO THE WATER. STIR DAILY. AFTER A FEW DAYS, THE MIXTURE WILL START TO FOAM, INDICATING THE BEGINNING OF FERMENTATION. LET IT SIT UNTIL THE FOAMING STOPS AND THE HERB REMNANTS SETTLE AT THE BOTTOM. THE PREPARATION IS READY FOR USE. STRAIN THE MIXTURE AND DILUTE IT WITH WATER AT A RATIO OF 1:10 BEFORE WATERING THE SOIL.

15.4.2

Nasturtium

Nasturtium is a colorful and fast-growing flower with round leaves and vibrant blooms in shades of yellow, orange, and red.

IT ATTRACTS POLLINATORS AND BENEFICIAL INSECTS, REPELS PESTS, AND IS SUITABLE FOR GROWING IN FLOWER BEDS OR AS A BORDER FOR VEGETABLE GARDENS.

Nasturtiums thrive in sunny or partially shaded locations and prefer light, moderately fertile soil.

Sow nasturtium seeds **directly into the ground** in late spring when the danger of frost has passed.

Nasturtium is also **edible** – its leaves and flowers have a peppery flavor and are excellent in salads.

USING NASTURTIUM AS AN EXAMPLE, YOU CAN INTRODUCE STUDENTS TO EDIBLE FLOWERS, SUCH AS PRIMROSES, VIOLETS, AND MARIGOLDS.

15.4.3

Rose

Roses are highly popular flowers due to their aesthetic blooms and pleasant fragrance. There are thousands of varieties, including ground cover, climbing, shrub, and English roses.

AS A SYMBOL OF LOVE AND BEAUTY, ROSES HAVE BEEN PRESENT IN VARIOUS CULTURES WORLDWIDE FOR CENTURIES.

When purchasing a rose plant, make sure to choose a **high-quality variety** and look for the **ADR label**, which confirms its resistance and easy maintenance.

Roses thrive best in **sunny locations** with **humus-rich**, well-drained soil.

Maintenance and care of roses include fertilizing, watering, pruning, removing side shoots and wilted flowers, and inspecting for pests and diseases. **All of these tasks can be carried out by students.**

TEACHERS CAN USE ROSES AS AN EXCELLENT EXAMPLE OF NATURAL PLANT PROTECTION AGAINST PREDATORS, AS THE THORNS SERVE AS A DEFENSE MECHANISM.

15.4.4

Tulip and daffodil

Tulips and daffodils are among the most popular spring bulbs that brighten up gardens with their beautiful blooms. They can also add a lively touch to your urban school garden.

Daffodils usually **bloom first**, **followed by tulips**, which grace the beds later.

Both species can be planted **on lawns**, **under trees**, or **among shrubs**, where they beautifully complement colorful flower combinations.

When planting **bulbs**, it is essential to **choose well-drained** and **nutrient-rich soil**, as they do not tolerate water retention, which can lead to rotting.

The ideal **planting** periods are **autumn** and **early spring** when the ground is not frozen and still moist. Plant **daffodils** as early as **September** and **October**, as they start root development early. **Tulips** should be planted a bit later, until **November**, to avoid diseases. Plant the bulbs at a depth that is two to three times their height.

Daffodils and tulips do **not require much maintenance**. After flowering, remove the flower stalks, but leave the leaves to die back naturally, allowing the plants to store nutrients for the next season. Regularly loosen the soil around the plants to ensure good aeration.

Most bulbs can be **left in the ground** after flowering, but some need to be dug up (check the specific variety).

Bulbs that are dug up should be cleaned, dried, and stored in a dry, cool place until the next season.

STUDENTS CAN LEARN ABOUT THE GROWTH CYCLE OF BULBS THROUGH TULIPS AND DAFFODILS AND UNDERSTAND THE IMPORTANCE OF FLOWERS IN ATTRACTING POLLINATORS TO THE URBAN SCHOOL GARDEN.

15.5

Insect hotel

You can enrich your urban school garden with an insect hotel that provides shelter for various beneficial insects, such as solitary bees, ladybugs, and other pollinators. This helps support natural plant pollination and encourages better crop yields in your garden.

An insect hotel offers students the opportunity to observe and understand the important role insects play in the natural environment.

An insect hotel also **allows beneficial insects to overwinter**, aiding in natural pest control and increasing biodiversity in the garden.

15.5.1

Building an insect hotel

If you have **enough space** in your garden, you can build an insect hotel using **old pallets**. Pallets allow for a multi-level structure and are very stable. Use up to 5 pallets of the same size.

Together with your students, **collect a variety of natural materials**, such as: **dry wood** (for beetles and fungi), **straw and hay** (for insects seeking shelter), **dry leaves** (for invertebrates), **bark**, preferably cracked (for centipedes and spiders), **bamboo sticks or wooden blocks** with drilled holes (for solitary bees), **stones and bricks** (for amphibians).

Also include some **thicker branches** and **small hollow sticks**, which will attract a wide range of insect species.

Explain to your students how different materials attract different kinds of insects.

CONSTRUCTION PROCEDURE OF AN INSECT HOTEL:

1. Place the **pallets on top of each other**, turning the bottom pallet upside down to create larger openings. These can also serve as a hedgehog shelter. **Secure** the pallets for greater stability.

2. Set up the insect hotel in a **semi-shaded spot**, such as near a fence or under a tree, as many insects, like spiders and beetles, prefer cool and moist conditions.

3. Ensure the hotel is on a **stable foundation**, as it may become quite heavy.

4. Divide **students into smaller groups**, with each group responsible for filling one section of the hotel.

5. Place **dry wood** horizontally. The cracks in the wood are suitable for some **beetles**.

6. Fill larger openings with **straw** and **hay**, which attract **insects** that like to burrow.

7. Place **bark and dry leaves** in smaller corners and cracks to provide shelter for **centipedes** and **spiders**.

8. **Bamboo sticks** and **drilled wood blocks** are intended for **solitary bees** and should be positioned in the sunny part of the hotel. The holes should vary in diameter to accommodate different bee species.

9. **Double-check** the stability of the structure. Allow **students** to add finishing touches, such as signs, labels, or decorations.

If there is not enough space in the garden for a large insect hotel, you can build a smaller one. Use a wooden frame, box, or crate as the basic structure and fill it with various materials, such as bamboo sticks, dry leaves, and hay.

If you have a fence or wall available, you can **hang** a **smaller insect hotel** on it, using a few bamboo sticks and wooden blocks with drilled holes, and attach it to the wall or fence. You can also attach the smaller hotel to a stake that you drive into the ground.

To make a simple insect hotel, you can also use **recycled materials**. Cut off one side of a Tetra Pak, and fill the interior with the selected materials. You can do the same with toilet paper rolls, paper towel tubes, or plastic bottles.

By using natural and recycled materials, you encourage creative thinking among students, teaching them about sustainable resource management and the circular economy.

Throughout the school year, students can observe which animals inhabit the hotel. They should also regularly check if the hotel is still in good condition and update or replenish it as needed.

CHAPTER 16

Where does our harvest go

Students who participate in urban school gardens learn valuable skills through practical experiences, gaining a deeper understanding of natural cycles and the importance of sustainability and food self-sufficiency. To truly internalize this knowledge, it is essential for students to understand how they can use the harvest in their daily lives.

The practical use of the harvest, whether in the kitchen or in artistic creation, strengthens students' connection with nature and encourages sustainable habits that are essential for the future, both for them and for our shared future.

When students observe the growth of crops with their own eyes, process them with their own hands, and then use them in cooking, artistic projects, or various products, they acquire valuable knowledge that goes beyond traditional subjects. Such experiences enable them to better understand the sustainable food chain, the importance of local self-sufficiency, and resource circulation. Additionally, these activities foster creativity, responsibility, and collaboration among students.

IN THE FOLLOWING CHAPTERS, WE HAVE GATHERED TEN SUGGESTIONS FOR INTERESTING ACTIVITIES AND PRODUCTS THAT CAN BE CARRIED OUT OR CREATED FROM YOUR HARVEST.

16.1

Herbal tea

If your garden is thriving with herbs, you can use them to make tea. Have the students gather herbs (such as mint, lemon balm, chamomile, etc.) and either dry or freeze them.

The best time to gather herbs is in the **morning** (when there is no dew), and the plants should not be wet or damp, as the most medicinal properties are found in dry, undamaged herbs.

For **drying**, choose a **clean, dry, and dark space**. Gently spread the herbs on clean paper, and they are properly dried when they crumble under your fingers. To preserve as many of their medicinal properties as possible, store the dried herbs in paper or glass jars.

ALSO, EXPLAIN TO THE STUDENTS THE PROPER WAY TO PREPARE THE TEA AND EMPHASIZE THE HEALTH AND WELL-BEING BENEFITS OF DRINKING "HOMEMADE" HERBAL TEAS.

16.2

Smoothie

Students can use their harvest to prepare delicious and healthy smoothies. All you need is a blender and, of course, your produce.

Students can mix different fruit and vegetable combinations and even add **herbs** to their smoothies. Teachers, emphasize the importance of a healthy and balanced diet and the role of locally grown food in a healthy lifestyle. You can **experiment** with ingredients, but if you'd prefer to follow pre-made **recipes**, you can find them below.

Gardener's Gnome:	**150g strawberries, ½ ripe red pepper, 2 cooked carrots, 4 ice cubes or ¼ dl water.**
Summer in a jar:	**200g strawberries, 1 sprig of mint, 1 apple, 1 cup of yogurt (preferably from a local farmer).**
Popeye:	**2 handfuls of spinach, 1 apple, sprig of mint, 4 ice cubes.**

16.3

Mint / Lemon balm syrup

One of the best ways to use mint and/or lemon balm is to make syrup, and there are many different recipes for this. Here's our version:

Ingredients:

- 3 l of water
- 3 kg of sugar (or less if preferred)
- 2 lemons
- 2 teaspoons of citric acid
- as much mint and/or lemon balm as possible (at least 200 g)

Preparation:

1. On the urban school garden, collect the mint and/or lemon balm with the students and wash it thoroughly under cold water.

2. In a large pot, pour the water, bring it to a boil, and remove it from the heat. Stir in the sugar and citric acid until they dissolve.

3. Dry the mint and/or lemon balm and cut it into small pieces (including the stems). Slice both lemons into rings.

4. Place the mint and/or lemon balm into the warm (but not boiling) water and cover it with the lemon slices.

5. Cover the pot and let it steep for at least 24 hours.

6. Before you start pouring the syrup into jars/bottles, explain the **sterilization** process to the students. **Jars and lids need to be heated to kill any bacteria and microorganisms**. The easiest way to do this is in the oven. Place the jars and lids in the oven, preheated to 110°C, and leave them there for 10-15 minutes.

7. Strain the syrup and pour it into the jars/bottles, sealing them tightly.

The syrup is excellent for making refreshing drinks or as a sweet addition to pancakes and ice cream.

16.4

Vegetable soup

A great way to use the vegetables from the school garden is by making vegetable soup. Students should pick the vegetables they have grown and prepare simple soups, which they can also enrich with herbs.

If your school garden has pumpkins, zucchini, carrots, potatoes, spinach, chard, tomatoes, onions, or similar vegetables, preparing a vegetable soup is the perfect choice.

Teachers, **guide the students through the entire preparation process**, from cleaning and peeling **(remind them that many vitamins and nutrients are hidden in the peel)**, to cutting and cooking.

ENSURE THAT NO EXCESS WASTE IS PRODUCED DURING PREPARATION AND EXPLAIN HOW LOCALLY GROWN VEGETABLES CONTRIBUTE TO HEALTHIER AND MORE SUSTAINABLE EATING.

16.5

Herb spread

Another interesting way to use herbs is by incorporating them into spreads. Chives, parsley, thyme, savory, and basil work wonderfully in various spreads.

Students should pick the herbs, chop them into small pieces, and add them to cheese **spreads**, **cottage cheese**, **sour cream**, **butter**, or **hummus**.

TEACHERS, SHOW THE STUDENTS HOW TO COMBINE HERBS WITH BASIC INGREDIENTS AND EMPHASIZE THE IMPORTANCE OF USING FRESH HERBS TO ENHANCE THE FLAVOR AND NUTRITIONAL VALUE OF DISHES.

16.6

Sweet corner (strawberries)

Strawberries are one of the most popular crops among students. Because they do not require much space for growth, they can be planted almost anywhere.

Once ripe, students should pick the strawberries from the garden and prepare them in various ways – they can eat them fresh, add them to spreads, make ice cream, dessert, or juice.

Teachers, guide the preparation process and encourage students to explore different ways of using strawberries, with special emphasis on the importance of seasonal and locally grown fruit.

FOR COMPARISON, YOU CAN OFFER STUDENTS STRAWBERRIES BOUGHT FROM THE STORE AND GROWN IN A FOREIGN COUNTRY FOR TASTING. COMPARE THE TASTE, APPEARANCE, AND SMELL OF STRAWBERRIES GROWN IN THE URBAN SCHOOL GARDEN WITH THOSE BOUGHT IN THE STORE.

16.7

Making soap

Herbs like lavender, rosemary, and even calendula can also be used in soaps.

To make soap, you will need 250g of soap base (glycerin), a tablespoon of dried lavender/calendula flowers, 10-15 drops of essential oil (optional), and molds.

IT'S IMPORTANT TO GIVE STUDENTS CLEAR INSTRUCTIONS SO THEY CAN MAKE THE SOAP INDEPENDENTLY:

Cut the glycerin soap into cubes and melt it (on the stove or in the oven). Once melted, add the flowers and essential oil. Pour the mixture into silicone molds and allow it to harden. The soaps can then be packaged in custom-made packaging.

Making soap from herbs grown in the urban school garden allows students to develop practical skills and encourages them to think about the versatility of using natural resources, strengthening their awareness of the importance of self-sufficiency and sustainable living.

16.8

Lavender sachets

Lavender flowers smell best when they are fully open.

Under your supervision, **students should harvest the lavender** flowers. **Dry** the lavender by placing the flowers on a mesh or paper towel in a dry, dark place.

Students should **cut small squares** or other shapes from **fabric** and sew them together on three sides to create small **pouches**. These pouches are filled with dried lavender flowers, and if desired, a few drops of **lavender essential oil** can be added for a stronger scent. Once the pouches are filled, students should sew the last side closed or tie it with a ribbon.

STUDENTS CAN TAKE THEIR FRAGRANT SACHETS HOME, USE THEM AS GIFTS FOR SCHOOL GUESTS, OR DISPLAY THEM AT SCHOOL EVENTS.

By making lavender sachets, students practice their handcraft skills and learn about natural alternatives for scenting spaces.

16.9

Creating gardening handbooks

Students can create gardening and other handbooks.

Students should list the herbs, fruits, and vegetables grown in the urban school garden, along with their characteristics, medicinal properties, and ways of use.

TEACHERS SHOULD GUIDE THE RESEARCH WORK AND ENCOURAGE STUDENTS TO GATHER INFORMATION FROM VARIOUS SOURCES. AN IMPORTANT SOURCE OF KNOWLEDGE COULD BE THE STUDENTS' GRANDMOTHERS OR RESIDENTS IN LOCAL NURSING HOMES.

You can also create **HERBARIA** with herbs or albums with photographs and descriptions of gardening activities.

16.10

Event organization

120

You can present your **produce** and **products** made from it at an event organized within the school. You can showcase your urban school garden as part of a **larger school event** or organize a separate one **dedicated solely to the school garden**.

Organize a market, bazaar, culinary workshop, or seed exchange.

You might choose to prepare a **culinary workshop** where students prepare dishes from the school garden produce and offer them to visitors.

If you decide to organize a **market** or **bazaar**, you can decorate or theme the stall (for example, a "**Green Stall**" displaying green-colored produce and dishes/products made from them, or a "**Sweet Stall**" with fruit and desserts). You can collect **voluntary contributions** for your products, which can be added to the school fund or used to purchase gardening tools and materials.

An interesting idea is also a **seed exchange**, where students prepare dried seeds, neatly packaged in handmade envelopes decorated with labels or drawings, and exchange them with parents, students from other classes or even other schools, the local community, or local farmers.

Such events are an opportunity to connect students, parents, and the local community, as well as a chance to share knowledge about sustainability and food self-sufficiency with a broader audience.

CHAPTER 17

Bibliography

In writing this manual, we have consulted numerous experts in the fields of sustainability, urban agriculture, gardening, school gardens, environmental education, and didactics.

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23. SOURCES OF PHOTOS: CANVA

CHAPTER 17

Appendices

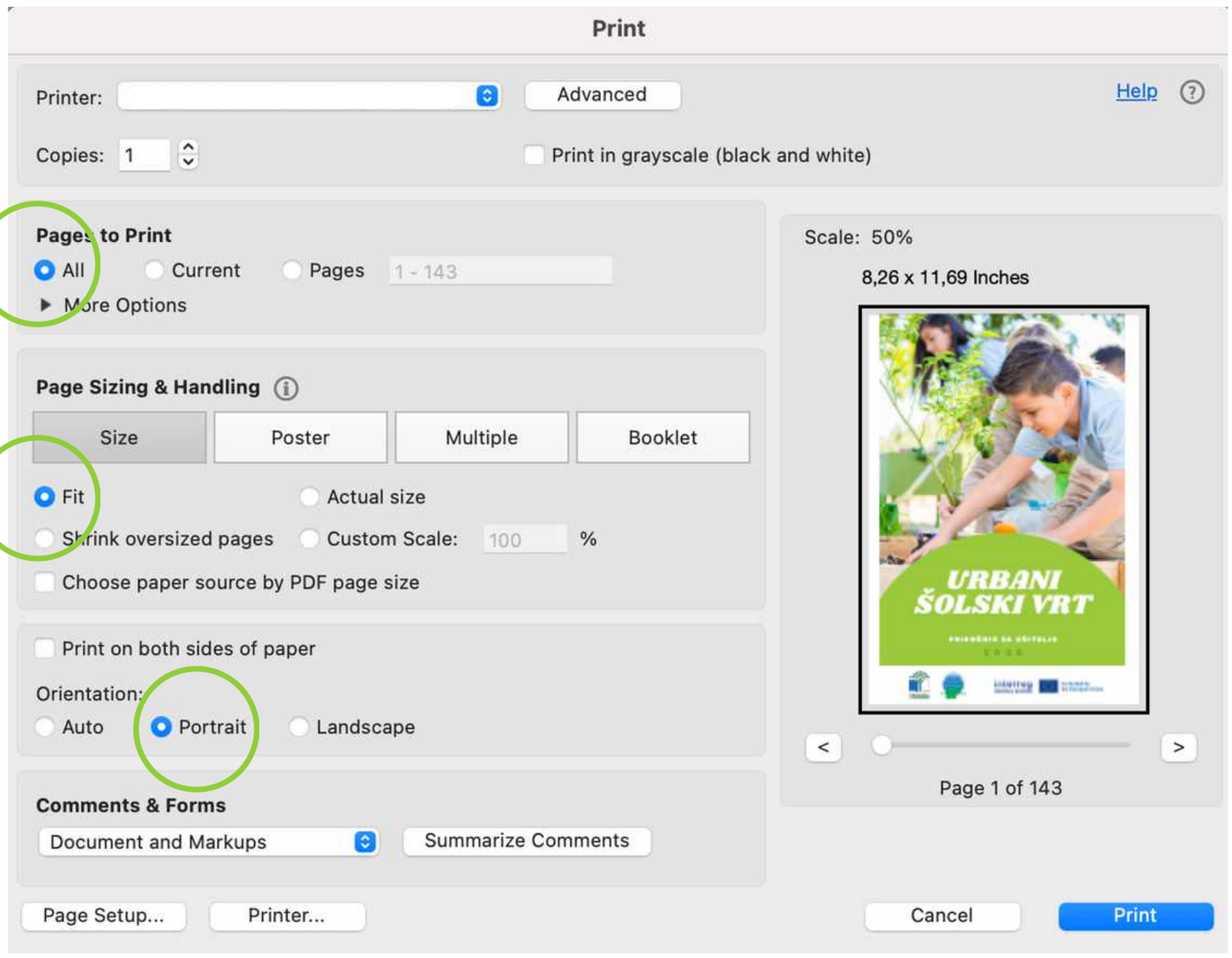
We have prepared numerous appendices that you can use for activities related to the urban school garden as well as during regular classes. We have also included printing instructions.

18.1

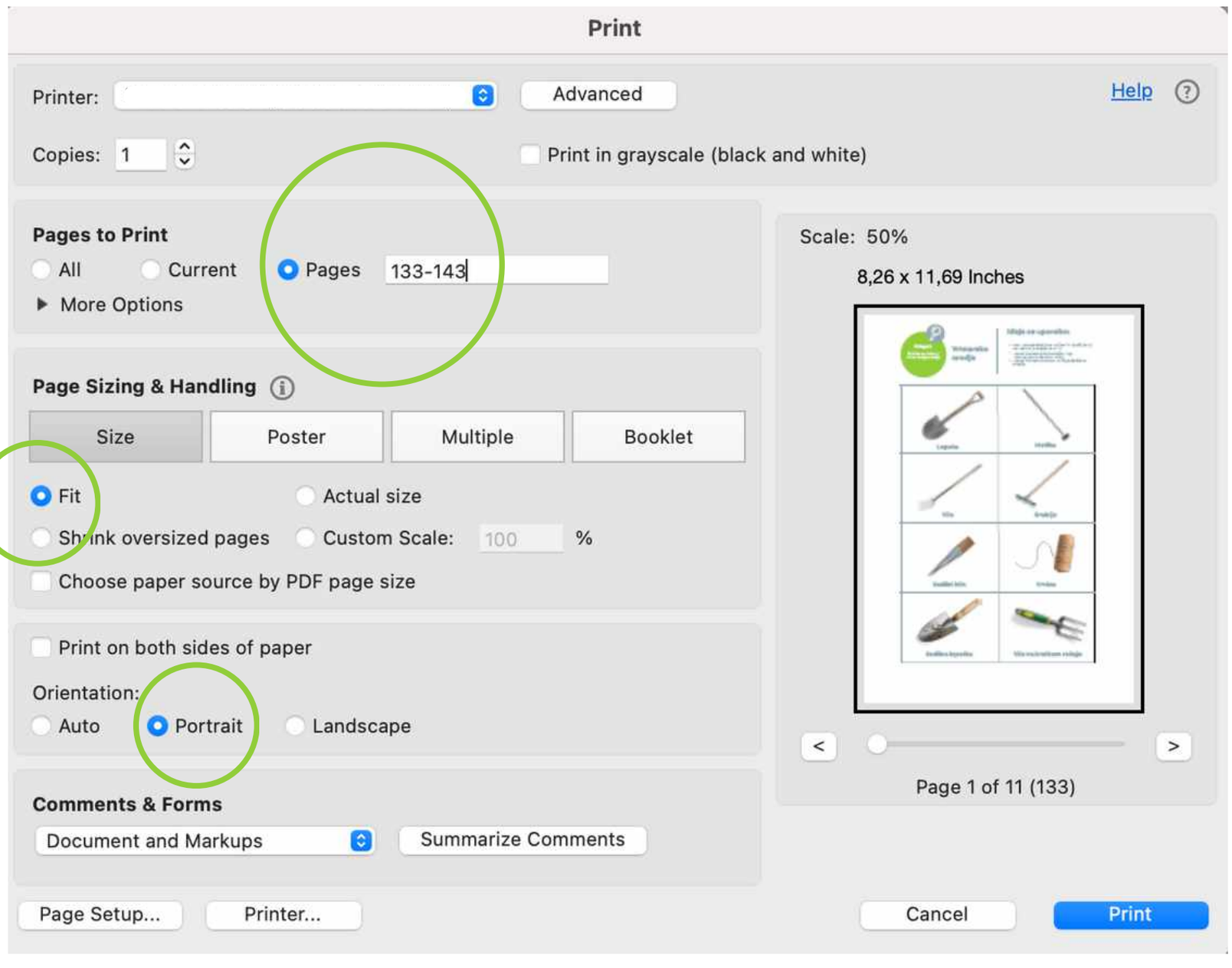
Printing instructions

We have also prepared printing instructions for you.

Printing the entire book:



Printing the appendices:



Appendix 1:

Gardening tools picture cards

Gardening tools

IDEAS FOR USE:

- each student receives one card and explains what the tool in the picture is used for;
- students identify tools that are used in the school garden;
- students draw additional tools in the empty boxes.

Shovel

Hoe

Garden fork

Rake

Dibber

String line

Hand trowel

Short-handled fork

Appendix 1:

Gardening tools picture cards

Gardening tools

Cultivator

Dutch hoe

Sprayer

Wheelbarrow

Pruning shears

Double hoe, soil loosener, weeder

Large shovel

Watering can

Appendix 1:

Gardening tools picture cards

Gardening tools

Large garden shears

Gloves

Seed tray, biodegradable tray with compartments

Garden stakes

Appendix 1:

Gardening tools picture cards

Gardening tools

Add your own ideas:

Appendix 2:

Picture cards of items that belong or do not belong in the compost

What belongs in the compost and what doesn't?

IDEAS FOR USE:

- each student receives one card and explains why the item in the picture does or does not belong in the compost;
- students create a poster divided into two sections;
- students compete in groups to sort the pictures correctly.

Fruit and vegetable scraps

Eggshells

Dry leaves

Coffee grounds

Cardboard

Hay

Broken glass

Plastic bottles

Appendix 2:

Picture cards of items that belong or do not belong in the compost

What belongs in the compost and what doesn't?

Plastic trash bags

Grass clippings

Wood shavings

Animal hair

Animal feces

Bones

Cooking oil

Banana peels

Appendix 2:

Picture cards of items that belong or do not belong in the compost

What belongs in the compost and what doesn't?

Add your own ideas:

Worksheet for monitoring soil pH and temperature measurements

Student name:

Class:

Start Date of Monitoring:

Appendix 3:

Worksheet: Soil pH and temperature

Instructions:

Regularly record the measured values of soil pH and temperature at depths of 5 cm and 10 cm in the worksheet. Also note any unusual weather conditions (precipitation, extremely dry or rainy weather). Monitor how soil temperature changes in relation to air temperature, and at what soil temperature the seeds begin to germinate. Indicate at which soil temperature you observed seed germination. In the "Notes" section, write down any significant weather events (heavy rainfall, drought, hail, etc.). After several weeks of measurements, analyze the data to determine whether there is a correlation between air temperature and soil temperature, and whether it affects seed germination and plant growth. Record your findings in the worksheet under "Findings."

date	*time*	*pH value of the soil*	*soil temperature* (5 cm)	*soil temperature* (10 cm)	*air temperature*	*notes*

Findings:

Appendix 4:

Summer duty schedule

Summer duty

WEEK	START DATE	END DATE	*NAMES OF STUDENTS/ VOLUNTEERS*	NOTES/ TASKS
WEEK 1				
WEEK 2				
WEEK 3				
WEEK 4				
WEEK 5				
WEEK 6				
WEEK 7				
WEEK 8				
WEEK 9				
WEEK 10				

Appendix 5:

Sowing calendar

Sowing calendar

VEGETABLE	SOWING TIME	SPACING BETWEEN SEEDS	ROW SPACING
BROCCOLI			
PUMPKINS			
ZUCCHINI			
CAULIFLOWER			
ONION			
BEANS, common			
PEAS			
KOHLRABI, underground			
KOHLRABI			
CARROT			
POTATO			
CUCUMBERS			
SPROUTS, Brussels			
KALE curly			

Appendix 5:

Sowing calendar

Sowing calendar

VEGETABLE	SOWING TIME	SPACING BETWEEN SEEDS	ROW SPACING
PEPPER			
TOMATO			
BEETROOT			
LEEK			
RADISH			
TURNIP			
LETTUCE			
SHALLOT			
SPINACH, summer			
SPINACH, winter			
CELERY			
CABBAGE, summer			
CABBAGE spring			
CABBAGE, winter			