INTRODUCTION TO URBAN PERMACULTURE


URBAN
PERMACULTURE


URBAN
PERMACULTURE

Introduction to Urban Permaculture – An Initial VET Course

Authors: Anna Margrethe Andersen, Erik Enebaer, Marin Kanajet, Ana Mikačić, Ivan Rako, Vedrana Vučenović, Zoran Vukšić (in alphabetical order)
Proofreading: Maria Fuentes, Ana Vieru
Design and Layout: Dan Badea
Permaculture Principles Illustration (page 11): Pero Vojković

FGU Aarhus, 2023
Olof Palmes Allé 39
8200 Aarhus
Denmark

www.fguaarhus.dk

Co-funded by the Erasmus+ Programme of the European Union

CECC

FGU AARHUS

InterCollege

PERMAKULTURA DALMACIJA

INTERBILDUNG e.V

TÜRKİYE CUMHURİYETİ MİLLİ EĞİTİM BAKANLIĞI · KOCAELİ

INTERNATIONAL INTERNSHIPS

PARTNERS

CONTENTS

INTRODUCTION

4 LESSONS - 9 HOURS

OUTDOOR URBAN PERMACULTURE

18 LESSONS - 39 HOURS

CONTENTS

CONTENTS

URBAN WILDLIFE

8 LESSONS - 23 HOURS

URBAN PERMACULTURE

PREFACE

90 hours introduction course

This is a 15 days (90h) introductory course to Urban Permaculture. Permaculture has various definitions, but it can be understood as principles for working with, rather than against nature: "Permaculture offers ways we can design human habitats, places for people to be, that work with nature." In this context, Urban Permaculture is understood as practical methods and principles for nurturing, maintaining, and using urban spaces that are harmonious with nature.

This Manual contains lessons on the use of wild edible plants.
WARNING: Do not use any plant without consulting an expert to identify whether the plant is suitable for human use. Also, make sure that you always use only those plants that have grown in an environment that is not polluted.
In several lessons it is stated that it is necessary to use power tools and other hand tools.
WARNING: Use tools safely according to the manufacturer's recommendations and only if you are trained to use them.
The authors of the lessons, project partners and the granting authority are not responsible for any property damage or threat to human health caused by irresponsible and careless use of this Manual.

Images used are free to use and there is no need for citing the sources. All digital assets used are created or generated by us and the pictures used are our intelectual property or free to use.

BACKGROUND

This course is a project output based upon a need analysis from the perspective of the following trends:

VET trend - In order to effectively address the dynamic and changing needs of the labour market, vocational education in the EU is changing from focusing on learning a narrow set of skills for a pre-defined, 'traditional' vocation, to offer broader transversal competencies for a dynamic labour market with transversal sectoral needs.

Demographic trend –It is forecast that the EU's urban population will grow from around 70% in 2020 to over 80% by 2050. A 10% increase in 30 years could result in 45 million more people living in cities across the EU.

Socio-political and cultural trends - The various dimensions of urban life – environmental, economic, social and cultural – are interwoven and success in urban development can only be achieved through an integrated approach.

Permaculture can be understood as principles for working with, rather than against nature, "Permaculture offers ways we can design human habitat, places for people to be, that work with nature."

There are increasing localised trends and grassroots movements in cities across Europe that align with the principles of permaculture such as rooftop gardening, wildflower planting, urban farming and urban beekeeping. However, if mainstreamed, principles of permaculture can be translated into all human activities within Europe's cities including occupational activity.

Based on this analysis the partners have identified a need to develop and deliver an introductory VET course in urban permaculture that is transversal and cross sectoral in that it can be integrated into different vocational directions. The course will offer VET learners an introduction on how to build and maintain healthy, sustainable and harmonious urban habitats.

THE COURSE

This VET (vocational education and training) course will address the learning needs of vocational learners in terms of an entry level understanding of Urban Permaculture. The course is not intended to educate high level horticulture or agriculture professionals, on the contrary it will offer an entry point and a holistic overview of Urban Permaculture for learners enrolled on various vocational education and training programmes.

The course will be transversal and cross sectoral so that it can be integrated into different vocational directions. For example, the course may be integrated into a wider initial vocational education in facility management, social work, catering and hospitality, art and culture, tourism, office administration etc.

The course will take a point of departure that any person entering urban based occupations will increasingly require innovative and transversal competences that will support them in maintaining their employability in ever-changing labour markets within Europe's urban areas. Irrespective of the type of eventual employment, the course will offer IVET learners an introduction on how to build,maintain, and make use of urban nature and green spaces in their occupations and work environments.

With reference to the target group more specifically, the course is targeting vocational learners with fewer opportunities. In this regard, fewer opportunities refer to learners who typically have faced challenges with learning in a formal or academic context. In order to address this target group, the course is supporting vocational learning through non-formal pedagogical practices, which do not result in a formal qualification, but rather acknowledges learning achievements through their practical application.

The non-formal pedagogical practices and didactic approach in this Urban Permaculture course is based on the following elements:

Practical "hands on" / Learning by doing approach

The course encourages teachers to give learners the possibility to work practically with urban permaculture, whenever possible. The practical approach internalizes the knowledge the learners receive in a deeper way than if the teaching is only done by lectures.

Open dialog

The course encourages the teachers to keep an open dialogue with the learners to motivate them to engage in urban permaculture as well as to find their own opinion.

Safe teaching environment

It is crucial to create an open and safe teaching environment for all learners independently of background and knowledge and encourage the learners to participate with all they have got - all competences are needed in working with urban permaculture.

LEARNING METHODOLOGY

Guidelines

The Urban Permaculture course consists of 39 Lesson plans that can be used as a whole (“crash course”) or as individual lessons. The lessons are distributed into 4 overall modules approaching Urban permaculture from a broad perspective:

1. Introduction to Urban Permaculture
2. Outdoor Urban Permaculture
3. Indoor Urban Permaculture
4. Urban wildlife

Lesson plan structure:

Description

A short introduction is given to what the upcoming lesson is about and what is expected from the learners and the teacher.

Duration

The estimated duration of lessons depends on its content, the lesson objectives and on the learning methodology which is provided through a step by step guide.
The teacher should try to keep to the estimated length of each lesson and only redistribute hours to optimise the learning flow. Connecting or intersecting lessons is desirable as long as the planned hours are still met.

Goal

Each lesson has one or several goals set. The goal defines what is expected from the lesson to deliver to the learners. The learner's level of understanding and engagement around the lesson subject before and after the lesson should be significantly increased.

Introduction/background

For every lesson an introduction to the lesson subject is given to support the teacher in preparing for the lesson. The important terms, facts and explanations are provided together with illustrations, photos and links for online research.
The teacher can use this information as a starting point for getting acquainted with the topics covered in the lessons.
Research on a local level is highly recommended in regards to environmental and climate conditions, social and communal policies, existing examples of good or bad practice within the community, and whatever else the teacher finds relevant.

LEARNING METHODOLOGY

Learning objectives

It is generally expected that the learners will gain a deeper insight into Urban permaculture, and, at a basic level, be introduced to its aspects which they will be able to implement in their everyday actions. They should not only be informed and able to use the terminology, but also recognise their own abilities, awaken their existing knowledge and potentials and possibly incorporate permaculture into their lifestyle, doing good for themselves, the community and the planet.
The learning objectives are divided into 3 categories:

- Knowledge
- Competences
- Skills

Preparation/materials/tools

To be able to adequately conduct all of the lessons, a "home-base" should be established, be it an existing classroom or a space which was prepared for 90 hours of lessons to take place. The course should be put into a detailed plan with dates for classes, field-trips, practical work, duration and the preparatory work needed.
It will be useful for both teachers and learners to have the basic equipment and materials ready on the spot. The learners might also be asked to bring their own learning tools if the course venue cannot provide everything.

- a drawing board
- notebooks for the students (blank A4)
- markers, pens, coloring pencils
- scissors, tape, rope
- laptop
- screen projector
- printed posters (A4, A3, A2)
- books and pdf-s about permaculture and urban permaculture
- other useful literature on sustainable development in urban areas

Additional material may be needed for specific lessons, specifically those that include indoor or outdoor practical exercises. These are listed within a specific lesson.
The teacher should prepare for every lesson by further exploring the subject of the lesson, finding more various examples and making the lessons relevant to the climate, community and other local conditions they are working within.

LEARNING METHODOLOGY

Step by step guide - learning methodology

Most lessons are imagined as theory and practice and are to be delivered indoors, outdoors or combined.

Some theoretical parts are given through lectures but some should be covered through group research tasks, facilitated co-learning, and moderated discussions. This way the learners are engaged into the process of discovering Urban permaculture together with the teacher, given a chance to identify their existing knowledge, competence and skills.

The learners will be motivated to acknowledge their individual interests, potentials and needs and will therefore contribute to the quality of the course by sharing and discussing.

The provided learning methodology is a framework for the teachers to use. They are welcome to come up with their own approaches and use the suggestions as a resource.

Through the course both the learners and the teachers are encouraged to document the process through pictures, logbook, film etc.

After finishing each module, there should be an hour of reflection and research of fund/help/collaboration.
If possible, the teacher should plan a practical exercise to conclude each module which will use the newly gained knowledge, competences and skills of the learners.

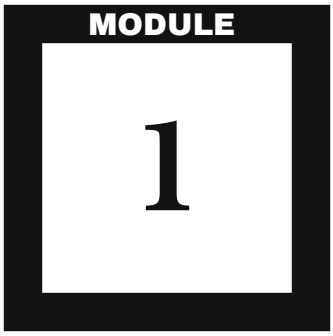
Reflection questions

After each lesson a reflection session should take place. Depending on the lesson subject it can be short or turned into a discussion if the teacher feels that the class has more to offer. However, the teacher should take care that the reflection session does not take away too much time from the very lesson.

The reflection questions are suggested as a guide for the teacher to follow-up on the lesson and make sure that the information has been passed on to the learners and that they have drawn eligible conclusions which will become a part of their future understanding of the subject.

Hopefully these guidelines will help you prepare and conduct a successful introduction course in Urban permaculture!

Good Luck



INTRODUCTION

4 lessons – **9** hours

MODULE I INTRODUCTION

Permaculture what is it?

DURATION: 2 HOURS

DESCRIPTION

It is essential for learners to be aware of the origin of the subject they will be approaching in the remainder of the course as well as the terminology which will be used further on. Through this lesson, they can gain perspective on how permaculture is trans-disciplinary and applicable in a wide variety of areas: Environment, economy-business, technology, society, etc.

Explore the "5 catastrophes" the world is facing today in regard to 5 elements: Earth (soil), water, air, energy (transport), and society. The learners should identify what is wrong with today's world in regard to environmental, economic, health and social issues.

Define "permaculture" by combining familiar and provided sources and challenging the learners to realise their existing knowledge and experiences connected to sustainable practices.

GOAL

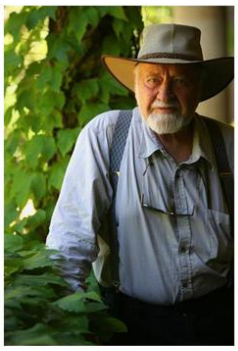
The goal of this lesson is to transfer the idea of permaculture to the learners; to provide them with definitions and terminology but also to engage them in thinking about why it is important to incorporate the permaculture approach in today's world. To have them notice, realise and come to conclusions about the reasons, possibilities and benefits to implement permaculture principles and design.

INTRODUCTION / BACKGROUND

It can be somewhat of a challenge to define the term permaculture in a simple way as there are various definitions available upon research. It would be best to begin with the origin of the compound **perma-culture**. It was coined by **Bill Mollison** and **David Holmgren** in Australia in 1978 as a combination of the words permanent and agriculture.

> Permanent = lasting or intended to last or remain unchanged indefinitely
> Agriculture = the science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.

David Holmgren

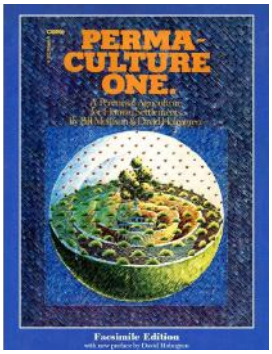


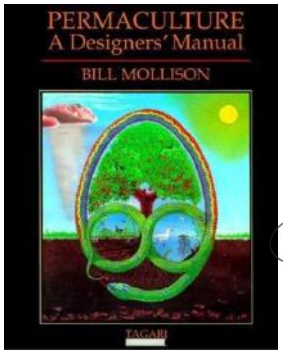
Bill Mollison

Permaculture, and subsequently the term, was created as a response to conventional (chemical and industrialised) agricultural practices which were starting to leave a noticeable effect on our planet. The idea of Permaculture was also highly influenced by the work of **Masanobu Fukuoka** in Japan and his **Natural farming** practice as well as indigenous and traditional knowledge.

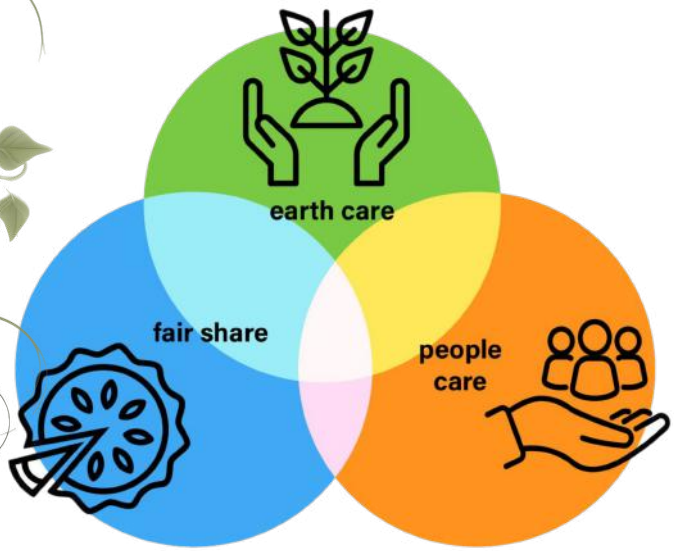
Masanobu Fukuoka

Mollison, a scientist, biologist and researcher, together with Holmgren - an environmental designer and ecologist, soon realised that Permaculture can (and has to) be more widely implemented than only in agriculture to make a difference - emphasising the web of connections within an ecosystem or a habitat. Hence, the compound simply became **Permanent-culture or Permaculture** and in this way again stressed its wide spectrum not exclusively linked to agriculture.





Permaculture One
& Permaculture A designers manual



3 permaculture ethics

At this point, it is important to notice that even though permaculture often involves agriculture/gardening as the central point of its development (also gardening is often the breakthrough for people to find out about permaculture), it is not a gardening technique. Permaculture does offer a line of solutions for growing food, but it rather observes nature and the environment as a whole and offers solutions within a holistic context.

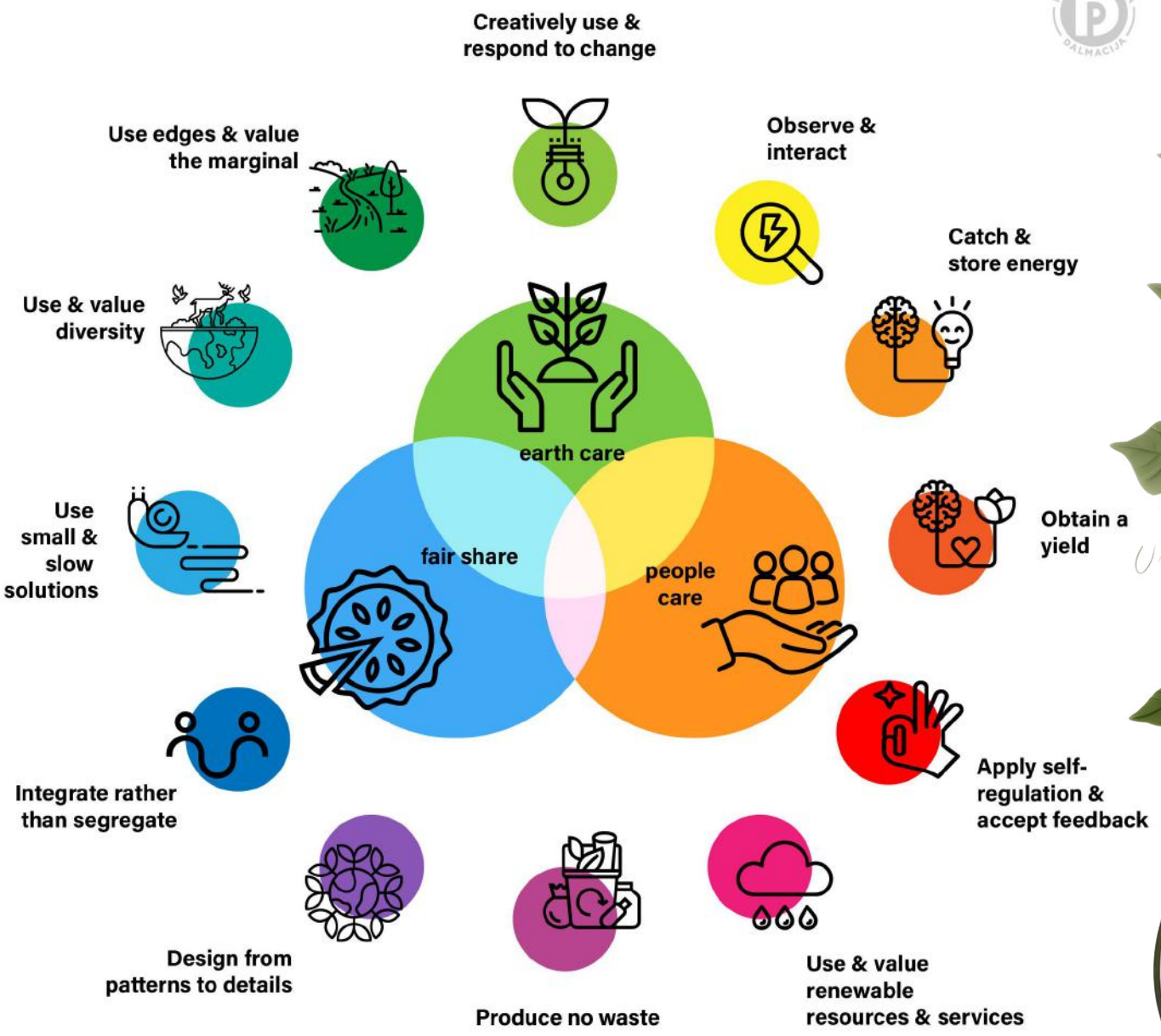
Permaculture can be defined as a discipline or philosophical approach which observes, interacts and cooperates with nature, rather than trying to control it or work against it, all while caring for the Earth and People and implementing Fair share. These can also be recognized as the 3 ethics of Permaculture. Earth care and People care are self-explanatory - the idea is that every action has these two ethical principles in mind. The fair share should be implemented both in humans mutual relations as well as human ←→ nature.

Permaculture design example

A possible further definition would include the term Permaculture design - a technique intended to implement permaculture by means of designing through imitating nature's patterns to create resilient and long-term sustainable habitats/ecosystems which save energy and protect the environment while creating abundance for the living beings. In this process, permaculture design addresses water management, energy efficiency, soil protection and management, air quality as well as the social aspect of the designed surroundings.

Digging deeper into permaculture, we should research the 12 permaculture principles as first defined in David Holmgren's Permaculture: Principles and Pathways Beyond Sustainability. These 12 principles can be generally applied not only to permaculture design but also as a way of gaining an objective understanding of our activities in general. The 12 principles are:

1. ***Observe and interact***
2. ***Catch and store energy***
3. ***Obtain a yield***
4. ***Apply self regulation and accept feedback***
5. ***Produce no waste***
6. ***Use renewable resources and services***
7. ***Design from pattern to detail***
8. ***Integrate rather than segregate***
9. ***Use small and slow solutions***
10. ***Use and value diversity***
11. ***Use edges and value the marginal***
12. ***Creatively use and respond to change***



12 PERMACULTURE PRINCIPLES

LEARNING OBJECTIVES

Knowledge

- To learn what permaculture is.
- To gain insight on the causes and reasons to implement permaculture.

Competences

- To learn what permaculture ethics bring to humans, their habitat and the environment.
- To understand how permaculture ethics can be applied

Skills

- To learn how the 12 permaculture principles can be implemented in everyday life.

PREPARATION/MATERIALS/TOOLS

- Books on permaculture:
  - Bill Mollison: Permaculture One
  - Bill Mollison: Permaculture - a Designers Manual
  - David Holmgren: Permaculture: Principles and Pathways Beyond Sustainability
- Masanobu fukuoka: The One Straw Revolution
- A documentary on permaculture like Inhabit
- Pencils and sheets of paper
- Whiteboard or big sheet of paper

STEP BY STEP/HOW TO

A 5 elements - 5 catastrophes

1. Write the 5 elements 1) Earth (soil), 2) Water, 3) Air, 4) Energy (transport), 5) society -one by one on the whiteboard.
2. When 1 element is written, ask the learners to identify the current situation in the world in regard to the written element by using only 1 word.
3. Write down the learner's words (as many as they say) - spend no more than 2-3 minutes per element.
4. Continue until all elements are covered.
5. Discuss

B Define permaculture

1. Hand a piece of paper and a pencil to each learner.
2. Have each learner write down 3 key-words which they would identify with the term PERMACULTURE.
3. Divide the learners into groups of 3-4.
4. Each group has to work together to come up with their definition of permaculture using the words they've written on the sheets of paper (they can add words)
5. They are given 5 minutes to work on the definitions.
6. One representative of the group writes their sentence on the whiteboard.
7. Discuss.

BONUS: Organise a movie night and watch the movie Inhabit: A permaculture perspective

REFLECTION QUESTIONS

- What is the current situation in the world in regards to environmental, economic, health and social issues?
- Why is permaculture important in our urban environment?
- Can you (and how) implement permaculture in your studies/line of work?

MODULE I INTRODUCTION

Climate change

DURATION: 2 HOURS

DESCRIPTION

Once learners are familiar with the permaculture principles and benefits of the regenerative approach for people and the planet, they will be asked to reflect upon the topic of climate change.

Climate change poses a major threat to humankind today. The path to an increased collective resilience to disasters, whose occurrence and intensity will be increasingly worsened by climate change, should start with an understanding of risk and vulnerability. According to the Sendai Framework for Disaster Risk Reduction[1], disaster risk reduction (DRR) is and should be everyone's business. Every decision and action taken at the individual or collective level will either make us more resilient or more vulnerable to natural disasters.

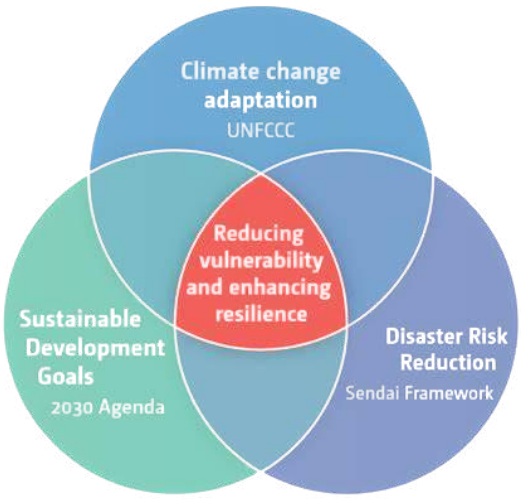
The lesson aims to clarify the causes and consequences of the warming planet and the purpose of risk management, as well as to encourage the learners to view permaculture as a disaster risk reduction measure that helps communities to sustainably build resilience to disasters.

GOAL

The lesson explains the human factors behind the causes of climate change, and the human actions required to reduce its impacts. Reducing disaster risk, together with adapting to the changing climate (climate change adaptation, CCA), is a prerequisite for a sustainable development (achievement of sustainable development goals, SDGs). Nature-based solutions (NbS) for disaster risk reduction in general, and regenerative practices in particular, are gaining importance and popularity for the multitude of societal challenges they can simultaneously address. Nature-based solutions are actions to protect, sustainably manage, and/or restore natural ecosystems, that address societal challenges such as climate change, human health, food and water security, and disaster risk reduction, simultaneously providing human well-being and biodiversity benefits.

The lesson's goal is to help learners understand the interrelatedness and synergies between DRR, CCA and SDGs (international agendas). However, since sustainability (regarded as activities that do not inflict additional harm to the environment) is increasingly considered insufficient to improve the degraded state of the planet, learners will be invited to brainstorm on how regenerative practices, such as permaculture, can boost the resilience of both nature and communities to disasters.

INTRODUCTION / BACKGROUND



Integration of CCA, DRR and SDG's

Climate change is a major threat humankind has ever faced. To prevent catastrophic outcomes threatening the survival of the human race, we must keep the temperatures from rising more than 1,5 degrees as per the Paris Agreement[1]. Addressing climate change involves all-of-society engagement in a two-tier approach:

- "***Mitigation***" – *reducing the amount of greenhouse gases in the atmosphere, and*
- "***Adaptation***" – *learning to live with the changed climate.*

Climate change is exacerbating existing disaster risks in terms of their intensity and frequency and will create new ones. Cities' capacity to assess risks, reduce the causes of disasters, be prepared for, and adapt to the changing climate will determine their community's resilience to disasters. **Resilience** enables the community to better anticipate, absorb and recover from external stresses. Despite the term 'natural disasters', disasters are not a natural outcome of the presence of a threat – they result from the systemic failure to identify, assess and reduce disaster risks (DRR).

The main goal of DRR is to avoid disasters altogether (loss of lives, material and environmental damage), which is not always possible (e.g. earthquakes). Therefore, DRR also strives to minimize or limit the negative impacts of hazardous events through continuous, interdisciplinary, all-of-society efforts to increase resilience to shocks and disasters. Disasters can be substantially reduced if people are well-informed and motivated towards a culture of safety, disaster prevention and resilience building. Therefore, disaster risk management, together with adaptation efforts, is essential for sustainable development.

Solutions in urban permaculture - Nature-based solutions for disaster risk reduction (NbS for DRR, also ECO-DRR) and for climate change adaptation (CCA) are gaining momentum for their multi-functionality. "Nature-based solutions must play a key role in disaster risk management", said Mami Mizutori, head of the UNDRR office. Nature offers us the chance to store extra carbon in the ground where it belongs, along with a myriad of other benefits for people's safety, well-being and prosperity.

Acting on the three principles of permaculture ethics (earth care, people care and fair share), use of renewable resources and energy storage, circular economy, nurturing and maintaining urban spaces in harmony with nature, biodiversity promotion etc., permaculture offers a wealth of tested regenerative solutions and guidelines for strengthening local resilience to disasters, which is a needed step further from sustainability.

The aim of creating regenerative cultures includes and transcends sustainability[1]. Instead of doing less damage to the environment (sustainability approach), it is necessary to learn how we can participate with and nurture the environment. By taking inspiration from how natural systems self-organize for resilience and productivity, permaculture as a regenerative nature-based solution is an ideal toolbox for achieving societal and environmental resilience and regeneration.

- The Paris Agreement | UNFCCC

LEARNING OBJECTIVES

Knowledge

- To understand the causes and impacts of climate change;
- To learn about concepts such as mitigation and adaptation, disaster risk management, vulnerability, resilience;
- To gain insight in why disaster risk reduction is a prerequisite for SDGs;

Competences

- To understand the multiple ways permaculture can help build community resilience to disasters.
- To familiarise the learners on how renaturing cities is related to disaster risk reduction;

Skills

To gain skills in observing one's own environment through disaster risk reduction lens and envisage regenerative solutions.

PREPARATION/MATERIALS/TOOLS

- Slides:
  Climate change - 30 min
  - greenhouses gas effect
  - images of climate change threats (floods, wildfires, drought, food shortages, heat islands, climate migrants, sea level rise,...)
  - mitigation & adaptation
- Disaster risk management and resilience - 30 min
  - Disaster risk management cycle & Disaster risk equation;
  - SDGs;
- Solutions in urban permaculture - 30 min
  - NbS for DRR (example of multifunctionality of urban trees)
  - Sustainable vs Regenerative practices
  - Group activity – 30 min

STEP BY STEP/HOW TO

A

- One group is handed out a set of images representing climate change causes / climate change effects / gray solutions for DRR / NbS for DRR / regenerative solutions (composting, mulching, etc.);
- They place the images in the right order from causes to effects, and should be able to differentiate between the solutions that are unsustainable vs nature-based, and multifunctional ones;

B

The other group is given a black and white poster of a neighbourhood showing urban threats (causing fire, flooding, heat islands, slides, degraded soil, etc) as well as unsustainable, sustainable and regenerative practices; they should recognize the threats and colour them red; unsustainable practices yellow, sustainable ones blue and regenerative ones green.

REFLECTION QUESTIONS

- What could be improved in your neighbourhood using NbS solutions to boost resilience to disasters?
- What can you personally do to decrease your energy consumption?
- What can you change about your habits to improve your resilience to shocks and crisis?
- What should young people be taught to make better informed decisions?
- How can society engage elderly people in boosting community resilience, at the same time making them feel included and contributing (combining Earth care and People care permaculture ethics)?

MODULE I INTRODUCTION

Urban permaculture

DURATION: 2 HOURS

DESCRIPTION

This lesson will narrow the context of permaculture from the global into the urban setting. A more in-depth approach will be given on how permaculture can be applied in cities; its benefits and perspectives as well as opportunities which it provides in regard to the challenges the world is facing due to the rising density of population in cities, climate change and the resulting issues.

Learners should remember what they found out about permaculture in the first lesson and now apply it to clearly understand what urban permaculture is. They should again refer to the 5 elements - 5 catastrophes and now observe and analyse them within the urban context.

Within this lesson, the concept of Ecological Footprint will be introduced and the learners will gain insight into the global ecological footprints that cities create on the planet, as well as the tools for measuring their own individual eco-footprints.

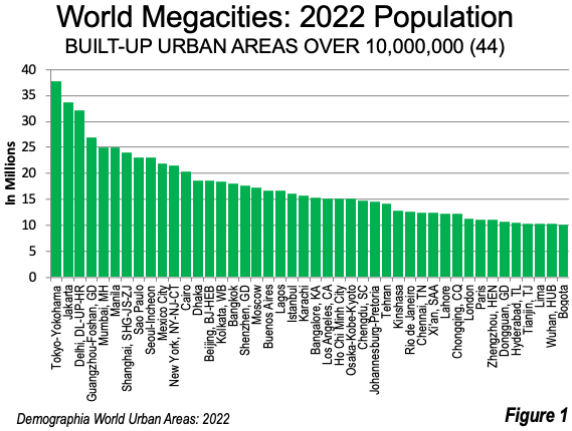
Ecological footprint illustration

GOAL

This lesson aims to place permaculture into an urban context and research its applicability in various aspects of the urban lifestyle. Learners will be engaged in applying the familiar principles, ethics and the 5 elements observation to better understand the perspectives and opportunities permaculture offers in cities. They will gain a clearer perspective on their individual roles and impact within their immediate surroundings and the ecosystem.

INTRODUCTION / BACKGROUND

The idea of applying the permaculture principles in cities was there from the beginning, with Mollison being aware that no solutions given globally to make the world a more sustainable (permanent) place, can be achieved if the cities did not fall into the scope. The main reason is simply that cities use up most of the planet's resources and leave a much larger ecological footprint than the actual area they are covering.



Demographia World Urban Areas: 2022

Figure 1

It is forecast that the EU's urban population will grow from around 70% in 2020 to over 80% by 2050. A 10% increase in 30 years could result in 45 million more people living in cities across the EU.

When observed from a permaculture perspective, the urban environment has significant inputs and outputs in reference to the 3 permaculture ethics, the 5 elements and the 12 permaculture principles.

The origin of Urban permaculture is mostly connected to urban gardening which is the focal point for developing permaculture in cities. Urban gardens add an invaluable social element to the community. Also, other than producing food, they can serve as a place to showcase sustainable water and energy management and other sustainable practices. Urban gardens have already proven their importance on several occasions; good examples are Cuba and Detroit which have overcome challenging periods thanks to the self-organisation of the community into creating areas for food production.

School garden, Primary School Skalice, Split

However, Urban permaculture is not only limited to gardening in urban or community gardens; it can be practised outdoors and indoors, regardless of the size and type of area. Essentially, permaculture can be implemented even in non-physical areas, such as businesses or any formal and informal structure.

Benefits and influence of permaculture

It is best to observe the benefits and influences of urban permaculture through the 3 permaculture ethics we're already familiar with:

1. People care

The benefits of a sustainably planned and managed "green" city for people are numerous; Just some of them being the obvious **health benefits** of eating local and organically grown food, **positive economic impact** from cost reduction by using renewable energy sources and reducing transport, **socialising**, and as a result of combining all of these - **increased mental health and wellbeing.**

2. Earth care

Implementing urban permaculture and its principles means **efficiency** in managing resources and therefore **reduction** in waste, less pollution, diversifying against risks, protection of natural habitats etc

3. Fair share

Once the permaculture principles are implemented as a whole, the opportunity to practice fair share within a community is largely increased. By means of **self-organizing** within a community with the goal to meet and sustain everyone's needs, fairness is achieved. In terms of fair share related to the human-nature relationship, it comes as a by-product of **returning resources to the Earth** via composting, increasing carbon storage in the soil, organic gardening which maintains air and water quality, etc.

Perspectives of permaculture

When applying the 12 permaculture principles within any design or management of the community, business or other - resilient systems can be developed. By observing all interactions as interdependent and as part of the whole, and by imitating nature's patterns, we can design structures which will be stable, adaptable and long-lasting, just like the ecosystem itself.

In this way, our observation spectrum widens and we can find multiple solutions to problems, or even see problems themselves as sources of the solution. Cultivating diversity and the connections between various elements increases resilience and provide multiple approaches to the same situation.

Beehive

Anthill structure

Opportunities within permaculture

As previously mentioned under the Perspectives within permaculture, the trans-disciplinary approach and varied set of tools and skills it offers can be practically integrated into building communities, businesses and, of course, ecological design of habitats. Also, the permaculture principles are complementary with the EU strategies, which confirms it can easily become part of companies' and public bodies' strategies as well.

We can integrate the permaculture skill-set and the principles into vocations, entrepreneurship, and businesses to develop new jobs or to add extra value to the existing ones. Through informal education, workshops, and offering permaculture education as part of public jobs crash courses, we can provide workers and managers with a new perspective on handling their tasks. By integrating these new ecological findings into existing working paradigms, we can ensure that all 3 permaculture ethics are being respected.

Elements

In Urban permaculture, we observe and work with the same 5 elements as within the global permaculture context: Earth (soil), water, air, energy (transport), and society. Again, notice how the elements interact and while observing positive and negative effects on one, they are transferred to other elements as well.

Throughout this lesson, the 5 elements should be addressed within the urban context and their interrelatedness observed at all times. Cities are typically polluted and this is mostly reflected in air quality, but also the heavy metals fall down and pollute the soil which can affect the quality of the food produced. At the same time, cities have some beneficial aspects - plenty of roof cover to produce energy from the sun, resources (and food) are close to the consumer etc. These are all to be inspected on a basic level within this lesson and will be more thoroughly covered within the remainder of the course.

Ecological Footprint is a tool used to measure groups of people (e.g. nation) or an individual's demand for space expressed in global hectares (or number of planets) needed to withstand their lifestyle if everyone lived that way. It can also be calculated for a specific activity (e.g. manufacturing a product).

Examples from different sectors

1

Primary sector

Also known as the extraction sector. Within permaculture it can relate to sustainable practices of using renewable resources (sun, fish, wool etc.)

2

Secondary sector

Production and distribution of goods. Permaculture principles can be incorporated to offer solutions to maintain production closer to the consumer - making both the production and distribution process sustainable.

3

Tertiary sector (service sector)

Can incorporate permaculture principles in both their management strategies as well as providing the customers with products which have been assessed through applying the 3 permaculture ethics.

4

Quaternary sector

As it has to do with education, training, research and development, obviously introducing permaculture as an informal learning possibility can largely add value to most vocations by developing new skills and competencies applicable to the jobs and tasks given.

LEARNING OBJECTIVES

Knowledge

- To learn what urban permaculture is.
- To gain insight on the current condition with population growth in cities with 3 ethics in mind.

Competences

- To gain self-confidence and independence through incorporating permaculture into personal growth, learning and work.
- To learn to observe benefits, perspectives and opportunities within permaculture and connect them to everyday experiences.

Skills

- To learn to measure the individual ecological footprint.

PREPARATION/MATERIALS/TOOLS

- A graphic clearly showing the 12 permaculture principles
- Pencils and sheets of paper
- Whiteboard or big sheet of paper

STEP BY STEP/HOW TO

A Calculate the Ecological Footprint

A.1. Of a company's product (can be one of the learners or the whole group)

A.2. Your individual footprint.

1. There are several Ecological Footprint calculators online which work on the basis of asking questions like: How do you travel to work/school? What kinds of food do you eat? How much water do you spend a day on average?
2. Research online and find a calculator which best suits your learners profile.
3. Use the calculator (take the test).
4. Compare results
5. Discuss possibilities of improving / changing habits to reduce the Ecological Footprin

B Improvements with the 12 permaculture principles

1. Learners can work individually or in groups
2. Based on the 12 principles, make a list of possible improvements to:

a) A nearby park / garden / courtyard
b) A building (ideally the building where the course is taking place)
c) Preparing a project proposal
d) Developing an innovative system for company management
e) Starting a new sector in your existing company
f) Your everyday lifestyle.

3. Pick at least one thing from the list and make a plan of implementation.
4. Discuss the probability of realization and what would be the first steps towards it.

REFLECTION QUESTIONS

- What happens when everyone's Ecological Footprint is larger than 1 planet?
- Why is it important to incorporate the 12 principles into urban development strategies?
- How can we apply the 3 permaculture ethics to promote the benefits of permaculture?
- How can we build resilience in the urban environment?
- How can permaculture be applied to develop new "green" jobs?

Funds and cooperation

DURATION: 3 HOURS

DESCRIPTION

Getting the right funding and finding appropriate resources can often be a big challenge everywhere. Normally, there is no or very little funds to do projects outside the ordinary curriculum. But very often if one looks closely enough you can actually find materials and resources in the community in your immediate vicinity. Companies, associations and individuals often have leftover materials of different kinds, as well as nature provides a lot of resources available, i.e.; seeds, soil and compost etc. Some companies, municipalities or the City Council may even have funding available to do "green projects", but here we will focus on the materials that could be found everywhere.

So, this lesson is about opening your eyes and looking for materials, learning how to engage the community and finding creative ways to make permaculture projects happen.

The lesson could be done as a "desktop project" where the student imagines building a small raised bed with plants (either flowers or edible plants) or preferrably making it in the real world.

The lesson consists of a brainstorm session, a research part, and a planning and creating part.

GOAL

The goal is to teach how to recognise the resources available in the community, how to engage others in participating and donating resources as well as take part in the urban permaculture project. The goal is to make the permaculture project happen even though there can be a lack of funds.

INTRODUCTION / BACKGROUND

In order to reduce the impacts on nature as well as the emissions and consumption of goods, this project highly stresses the need to use the (used or secondhand) materials and resources at hand and collaborate to find ways to do that. This lesson is a micro “experiment” or training session in doing so.

There is a lot of inspirational material available in building raised beds from used materials. ex. Pinterest is a great resource to find how to guide as well as inspiration to build from.

Information on soil, the seeds and the planting method etc. can be found in other lessons in this course. The focus here is to locate materials and make urban permaculture happen even though there might be lack of money.

Since this lesson is about locating and providing materials, an important element to discuss with the students is, how to approach people and how to engage people in projects that you do. To talk about being open, interested, having material about the project ready etc.

Another issue could be to map your network; people the students know, their parents know, the teacher know etc. and how to engage your network in making the project happen. This is a good exercise that can be useful for the students in other aspects of their lives. When talking about networking a possible subject could be to talk about how to broaden one network and how to engage your network.

The raised bed is meant to be a simple construction that does not need a lot of building skills to do. One could however use this lesson to teach using basic tools and building out of used wood.

An Gairdin Beo, Carlow

LEARNING OBJECTIVES

Knowledge

To understand that permaculture projects can be done even though funding from the traditional sources is limited and can be done through collaboration and networking.

Competences

To learn to identify, collaborate with and involve persons, organizations or other communities / NGOs - here described as resources in the community.

Skills

- To gain know-how to locate resources in the community.
- To learn how to connect and make stronger bonds with members of our community and to learn how to involve the members, the companies and organizations in a common project.

PREPARATION/MATERIALS/TOOLS

- Regular pencils, colored pencils, crayons, assorted colored construction paper,scissors, rulers, colored markers, glue, tape, glitter, ribbons, stencils...
- Sheets of poster paper.
- Hammers, screwdrivers, screws.
- Sponsored materials; from seeds to wood, soil, plants, bags, etc...

STEP BY STEP/HOW TO

Goal

- To examine people's attitudes toward and expectations of people with different equity (economic backgrounds).
- Time: 30–35 minutes

Materials

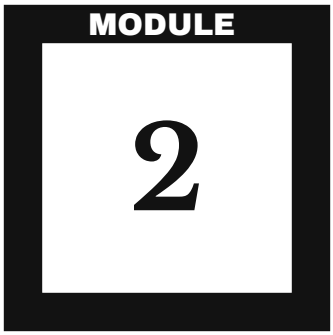
- Five large ziplock bags with the following art supplies for each of the five groups
- Group 1: Regular pencils and one colored pencil
- Group 2: Regular pencils, colored pencils, crayons, assorted colored construction paper
- Groups 3 and 4: Regular pencils, colored pencils, crayons, assorted colored construction paper, scissors, colored markers, glue
- Group 5: Regular pencils, colored pencils, crayons, assorted colored construction paper, scissors, rulers, coloured markers, glue, tape, glitter, ribbons, stencils, and anything you can add to help this group

Procedure

1. Prepare a Brainstorm session, asking; A: What do we need to build Raised Beds; wood, machinery, soil, plants, seeds, etc...
2. Where can these materials be found / located in our community? (The local waste central, second hand / thrift shops / companies with leftover materials from production, municipal departments working with gardening, plants, etc...)
3. Identify and map who could help you find or provide your needed materials.
4. How can you communicate the story about the sponsor's participation in the project? How can the Raised Beds become useful for the community and participating companies? Is it good for building a strong CSR narrative or just good for food production for the company?
5. Make a visual presentation of the project - a poster, a website, a facebook site or a logo telling the story about the project. Make it involving and engaging - open to suggestions from the companies involved.
6. Reach out and connect / visit companies, persons, departments, municipalities and invite them into the project using the printed material or fb sites. Prepare the students to make the contacts - describe the task carefully.
7. Hopefully by now, you'd have sufficient material to start collecting resources and elements for realizing the project.
8. Plan an event for the companies for presentations and engagement - and start building:-)
9. Tell vividly about the project on SoMe and document the development of the project using film and photos on the SmartPhones.
10. Make interviews with the local people and ask them if the project matters.
11. Invite the media to visit the project and tell them about your project.

REFLECTION QUESTIONS

- What challenges and opportunities do you see when collaborating with the local community?
- How does it affect your life?
- What is the most important thing you learned from this project?
- How can the things you learned in this project be effectful in other parts of your life?
- What have you learned from the collaboration with the teachers and fellow students?
- In what way has the project changed your perception of resources and their availability?
- How can you contribute to the sustainable development of your local community?



OUTDOOR URBAN PERMACULTURE

18 lessons – **39** hours

MODULE 2 OUTDOOR URBAN PERMACULTURE

What is outdoor urban permaculture

DURATION: 2 HOURS

DESCRIPTION

This lesson will introduce the learners to the aspects of designing and applying permaculture principles outdoors - in the urban environment of both the towns and cities. A general understanding of what the current condition of the 5 elements within an urban environment is and where and how can permaculture (design) be applied to respond to these conditions to turn them around so that they respect the 3 permaculture ethics.

GOAL

This lesson will provide the learners with a focused understanding of where, when and how permaculture can be applied to make urban environments safer, healthier and more in line with nature's ways.

INTRODUCTION / BACKGROUND

The urban environment is facing severe issues in several domains such as: construction and building, transportation, energy, water and waste management, air quality, food production, community etc. Usually public bodies follow the same conventional practices in design, production and management / maintenance, which further degrade the urban environment and therefore greatly influence the life quality of its inhabitants.

Outdoor urban permaculture is a set of principles applied outdoors, based on permaculture design intended to raise the life quality of a city's or town's inhabitants while providing solutions which are working together with nature. These principles can be implemented in all of the above mentioned domains and even wider.

To observe the city or town as a whole - the interaction of elements and functions within a system is essential both in the matter of understanding the problems and the solutions.

LEARNING OBJECTIVES

Knowledge

To understand the challenges the urban environment is facing and how it is reflecting on the community and the Earth.

Competences

- To learn how the 5 elements interact and reflect on each other.
- To understand what fields / lines of work / services can Urban permaculture be applied to

Skills

To gain know-how on where Urban permaculture can be applied outdoors..

PREPARATION/MATERIALS/TOOLS

1. Prepare by observing the surroundings of the venue where the course is held.
2. Observe and note various elements, functions, materials and sensations.
3. Choose a route on which you will take the learners to observe the urban environment.
4. Prepare a camera or good mobile phone to take photos.
5. Pen and paper to note what is observed during the exercise.

STEP BY STEP/HOW TO

A Name the functions of an element

1. Pick an element from the environment (e.g. a tree).
2. Try to name as many functions of that element with your learners.
3. Notice other elements being mentioned in reference to the chosen one. What are those element's functions?
4. Discuss the interaction, interconnection and dependence of the elements

B Observing the urban environment

1. Take your learners outdoors to the immediate surroundings
2. Observe the urban environment, take photos and notice:
- elements from which it consists (e.g. people, buildings, roads, trees, animals, garbage cans, playgrounds etc.)
- functions, inputs and outputs; what is the element taking in and what is it giving back? - materials; organic or non-organic origin, resources from which they are supplied - sensations e.g. protection - exposure, cold - warm, ugly-beautiful etc.
3. Discuss the interconnection of elements - how are they interacting with each other?
4. Have the learners pick one element to imagine being taken away from the urban environment - How will the other elements react? How will it influence their functions? Will the sensations change and in what way? Try it with different elements.
5. Think of a few public service jobs - how are they interacting with the elements; what is their role in maintaining the elements?

REFLECTION QUESTIONS

- Why is our urban environment sustainable or not sustainable?
- How can permaculture principles and ethics affect existing public-service jobs and workers?
- Which can be the expected positive effects of implementing permaculture in the urban environment?

MODULE 2.1

URBAN ENVIERMENT

Analysis and design tools

DURATION: 4 HOURS

DESCRIPTION

This lesson is to introduce a set of tools used to identify the problems, needs, potentials and other specifics of the environment and how to implement permaculture design to respond to them. So far the learners have become aware of what urban permaculture is and where it can be implemented; now it is time they gain the skills and tools on how to use it to imagine and produce sustainable and regenerative systems - not only in environmental design but also organisational (off-land permaculture design)

GOAL

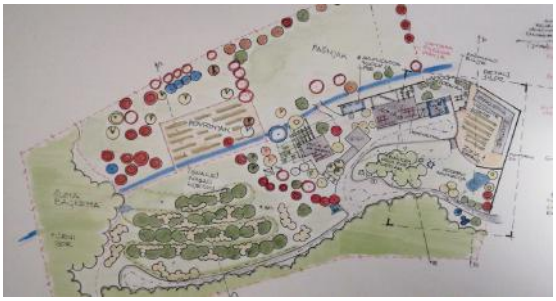
The goal of this lesson is to provide the learners with the ability to observe and identify problems in urban outdoor environments and to encourage them to use permaculture design as a tool to respond to those problems with creative sustainable solutions.

INTRODUCTION / BACKGROUND

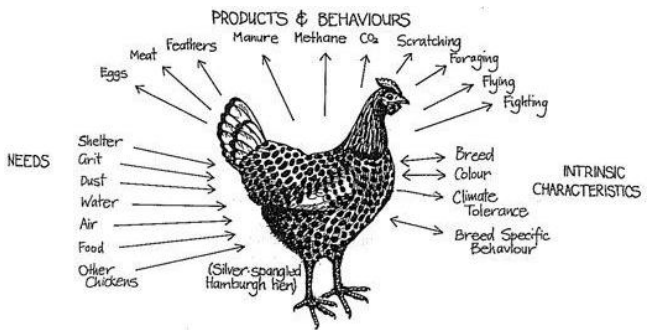
As the interaction of elements is observed when analysing the urban environment, in the same way the elements are designed to correlate with each other in creating holistic, permanent and regenerative solutions. The origins of permaculture design start with Bill Mollison's structure of analysing the existing conditions in an environment. Mollison's analysis consists of:

- Field analysis: water, soil, climate etc.
- Social circumstances: local community, legislation etc.
- Energy and technology
- Abstract components

Although it was not originally imagined by Mollison or Holmgren, it has become a standard of permaculture design to use the **5 elements analysis.** The elements being the same ones already appearing through this course. The analysis should be thorough looking into the wider context (climate, any distinctive regional aspects etc.) as well as the more specific (soil pH, vegetation, water on the terrain etc.).
A good design enhances the condition of all 5 elements and creates as many connections between them to create a resilient system.
Every analysis should include an **analysis of the needs, wishes and possibilities** of the people which will be using the designed area. Also, any obstacles or opportunities coming from either the people or the environment should be considered.
Furthermore, a **sector analysis or external impacts analysis** should be conducted. Sector analysis shows how the location is influenced by outer elements; for example: wind, noise, views to or from the place we are designing, sunlight, etc. The idea behind the sector analysis is to identify problems and respond to them as well as to identify opportunities and make use of them.

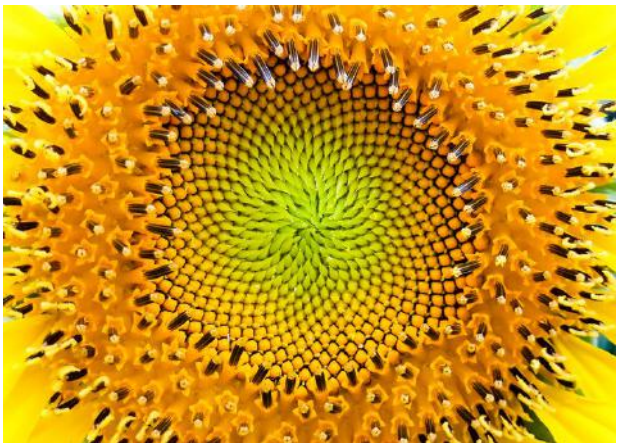


Nature has found many ways of **optimising** its processes - we are to observe these patterns and try to imitate them. In nature **one element performs several functions** within the ecosystem but also takes various inputs. This is what makes a functional ecosystem resilient. When designing, we should also be aware of how to make the best of an element - to have it serve various functions but also to be sustained by different inputs.

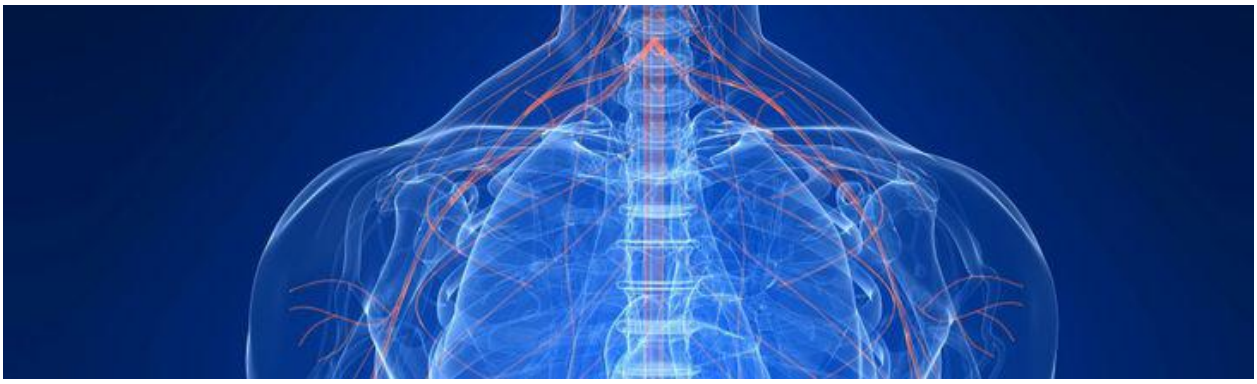


The "permaculture chicken"

Permaculture design draws inspiration from **nature's patterns**, indigenous knowledge as well as modern technological solutions and science. When it comes to patterns there are several interesting examples of where nature creates perfect design to make the system optimized, strong and ever-lasting.



Fibonacci spiral



Interconnection in nature
(mycorisis, nerve system, lightning)

Fractals

Another common design tool is known as SADIMET - also easily applicable for off-land design.

Survey
Analysis
Design
Implementation
Maintenance
Evaluation
Tweaking

Zoning

When applying permaculture design, zoning is an essential design tool. Starting from **zone 0** being the home (house, apartment or building), **zone 1** being the area of everyday constant intervention (e.g. compost, salad and spice garden etc.) to **zone 5** being the area of no intervention but only observing and learning from nature (forest).

In an urban environment **zones 2, 3 and 4** can be a community garden or orchard, a building's rooftop terrace, a park-forest; they are visited occasionally, based on needs for maintenance. It is also common that not all zones are existing in an urban environment or they are very close to each other and intersecting or they are distantly apart. It is important to get the zoning right as it will save energy in the long run.

LEARNING OBJECTIVES

Knowledge

To learn which analysis and design tools exist.

Competences

- To understand what zoning is and how it is applied in an urban environment.
- To learn which nature's patterns we can imitate to achieve a resilient design solution.

Skills

To learn to perform an overall analysis of an environment and its inhabitants (users).

PREPARATION/MATERIALS/TOOLS

- An orthophoto or google maps satellite image of the location(s) you will analyse.
- Observe the location before the lesson.
- Prepare a few copies of the printed location (ideally in scale and in colour).
- Coloring pencils, markers, pens.
- Notebooks.

STEP BY STEP/HOW TO

1. Distribute the learners into groups - they can all work on the same location or each group can choose their own.
2. Visit the location(s) while viewing the satellite image to gain a sense of size.
3. Identify who are the users of the location and conduct short interviews with them (if there are no users you can interview, have the learners imagine themselves as the users and conduct interviews among each other)
4. Conduct a 5 elements analysis.
5. Conduct a sector analysis.
6. Each group presents their analysis results.
7. Discuss possible design solutions according to the analysis results.
8. Make a zoning map for the chosen location.

REFLECTION QUESTIONS

- What can we find out about when conducting an analysis of a location?
- Why is it important to first analyse a location we will be designing?
- How can we use nature's patterns to make our design sustainable and resilient?
- How can we incorporate permaculture analysis and design tools in our existing work?
- Does implemented permaculture design enhance the life-quality of the users? How?

MODULE 2.1

URBAN ENVIERMENT

Community

DURATION: 1 HOUR

DESCRIPTION

This lesson is to introduce the students to the effects of a highly diverse society in cities and the way that citizens, members of urban communities interact with each other. Differences between us often lead to misunderstandings, tensions and conflicts. Diversity enhances creativity. It encourages the search for novel information and perspectives, leading to better decision making and problem solving.
Talk to your students and by observing and interacting with your neighbours and other members of your community, one can learn that by accepting others and their knowledge and experience we can build a stronger and resilient society.

GOAL

The goal of this lesson is to teach the importance of a community in the urban areas, what it is and what are the challenges and the benefits of highly diverse communities we find in urban areas. To understand how protection of social diversity is as important as biodiversity and learning how to apply permaculture principles on communities we can achieve social equality and equity.

INTRODUCTION / BACKGROUND

Urban communities have a higher level of demographic complexity. The bonds that connect urban community members are often weak. This is because people living in urban communities often come from many different places and do not have long-established connections. They often do not know one another nor have a strong understanding of each other's lives and background. There are often difficulties in engaging participation due to differences in income level, standard of living, and lifestyle.

On the other hand, Social Diversity means a successful community in which individuals of different socioeconomic status, education, language, geographical origin, mental health, physical health (e.g. permanent disability) gender, sexual orientation, race, ethnicity, age, religious beliefs, bring their different knowledge, background, experience and interest for the benefit of our community.

Permaculture's three core ethics are care for the earth, care for the people, and care for the future—that third ethic is also often framed as "fair share": Share surpluses and reduce consumption. These ethics can serve as a guideline for weighing our decisions and actions.

Permaculture has a set of principles that can be translated directly into social applications.

For example, when designing a garden we understand that diversity is a value.
In human systems, valuing diversity might lead us to value our differences instead of letting them divide us. A community that includes people of diverse ages, genders, races, sexual orientations, physical abilities, and economic backgrounds, as well as diverse ideas, cultures, and opinions, will have broader perspectives and a deeper understanding of issues and events, as well as more resilient responses.

The principle of edge or ecotones, for example, tells us that where two systems meet, a third system arises, dynamic and diverse. Where two human systems meet, we can expect great creativity and possibly also tension and conflict. Systems change from the edge, and systems also resist change and try to maintain themselves. So when we set out to change a system, we can expect both resistance and opportunities for great creativity and surprises.

"Capture and store energy" - there are also many forms of human energy and creativity we can benefit from that often go to waste - when young men or women, or people of limited economic means are excluded from programs or projects, for example. And "obtain a yield" is a good principle for activists and communitarians to remember when we fall into the trap of exploiting ourselves out of our altruistic desires to serve a greater good. We also need to get something back, to sustain ourselves economically, emotionally, and physically.

Permaculture also looks at patterns. What are the patterns and understandings that can help us structure groups in a healthy way? What tools and techniques—from ecology, but also from psychology, social science, spirituality, and the human potential movement—can help groups communicate more clearly, resolve conflicts, and function better?

Content taken from: https://www.ic.org/social-permaculture-what-is-it/

LEARNING OBJECTIVES

Knowledge

To understand the characteristics of urban communities.

Competences

To learn to identify the challenges and benefits of highly diverse urban communities.

Skills

- To gain know-how in applying permaculture's ethics and principles to the community
- To learn how to connect and make stronger bonds with members of our community.

PREPARATION/MATERIALS/TOOLS

- Ziplock bags
- Regular pencils, colored pencils, crayons, assorted colored construction paper,scissors, rulers, colored markers, glue, tape, glitter, ribbons, stencils...
- Sheets of poster paper.
- Block party planning guides

example: *https://sdsynod.org/wp-content/uploads/2012/05/Block-Party-Kit.pdf*

STEP BY STEP/HOW TO

Unequal Resources

Goal

- To examine people's attitudes toward and expectations of people with different equity (economic backgrounds).
- Time: 30–35 minutes

Materials

- Five large ziplock bags with the following art supplies for each of the five groups
- Group 1: Regular pencils and one colored pencil
- Group 2: Regular pencils, colored pencils, crayons, assorted colored construction pape
- Groups 3 and 4: Regular pencils, colored pencils, crayons, assorted colored construction paper, scissors, colored markers, glue
- Group 5: Regular pencils, colored pencils, crayons, assorted colored construction paper, scissors, rulers, coloured markers, glue, tape, glitter, ribbons, stencils, and anything you can add to help this group

Procedure

1. Ask participants to form five groups, with three to five people in each. Tell participants that each group will make a poster to celebrate a holiday, season of the year, or other occasion. All groups should make a poster about the same holiday or occasion.

2. Tell them that each group will receive a bag of supplies to use in making their posters. They can use only the supplies given to their group; they may not borrow supplies from other groups.

3. Tell them that their finished posters will be put on display and that they will have 15 or 20 minutes to complete their posters.

4. Give each group a large sheet of poster paper. Have the bags of supplies in view for all to see. Then give each group one of the bags. Hold up the bag (in an inconspicuous manner) so that all groups see the bag that is being given to each group. You need not comment on the contents of the bag. If participants ask why the contents are different, just say that these are the supplies available for your group. That's the way it is.

5. Give participants a five-minute warning. When the allotted time is up, ask participants to put their unused supplies back into their bags. One at a time, call each group to come up to the front of the room to display and explain their poster. After each presentation, applaud the group.

6. When all groups have completed their presentations, engage the group in a discussion about this activity.

Discussion

1. How did you feel when you noticed that some people had more materials than you did?

2. How did you feel when you noticed that some people had fewer materials than you did?

3. In what ways did resources affect your project?

4. How would you have felt if I had judged your final products for a prize or for a grade?Would that be fair? Why or why not?

5. If other people saw your posters and were asked to pick the most talented students in the room, whom would they say? Would these posters necessarily be a fair assessment of what all of you can do?

6. Why do you think I set up this activity this way?

7. In what other situations do people have advantages over others? (Provide some examples to prompt the class.)
8. Is it important to consider individual circumstances and opportunities before judging a person's capabilities? Why or why not?

Adapted from: Byrnes, D. A. (1995). "Teacher, They Call Me a _____!" Confronting Prejudice and Discrimination in the Classroom. Logan: Utah State Office of Education.

Research community needs

Make a plan on how to reach out to your friends, neighbours, volunteers and community members to find out what your community needs in the upcoming months. Write down a questionnaire / connect with your local community centres, homes for the elderly, other schools/companies and organize interviews/human library (https://humanlibrary.org/) or just go out on the street and talk to locals.

Connect with your community

Write down a plan for a block party. Discuss between yourself what it would look like. Example: At the party people help paint a mural on the side of the building that has been abandoned, neighbours put out items on their lawn (that have been gathering dust in their attic) for people to take, people bring their favourite recipes, kids play group games, neighbours meet other neighbours... There are conversations about how to make the neighbourhood better. Several needs are met by this gathering.

REFLECTION QUESTIONS

- What is community for me and how does it affect my life?
- How does social diversity impact interpersonal relationships in my community?
- What are or could be challenges and benefits of social diversity in my community?
- If there were no differences between us what would communities look like?
- How mutual understanding and acceptance make healthy and resilient communities?
- How can I contribute to the process of making a strong community where everyone is appreciated and has equity?

MODULE 2.1 URBAN ENVIERMENT

Well-being

DURATION: 1 HOUR

DESCRIPTION

This lesson is to introduce the learners to the term well-being. How our environment, society and our own thoughts, feelings and acts affect our well-being.
Urban areas are extremely complex environments in which a large number of environmental, social, cultural and economic factors have an impact on individual and population health and well-being. Urbanization presents opportunities and risks, as well as enormous challenges for maintaining and improving human and nature´s well-being.
There are many links between permaculture and well-being that include holistic approaches to achieve welfare for us, people and nature around us, in a sustainable way. Talk to your learners and find out together how a permaculture approach can benefit their well-being. Spend time in green spaces or bring nature into your everyday life and surroundings to benefit your own well-being.

GOAL

The goal of this lesson is to teach learners the importance of recognizing which factors impact our well-being and how our feelings and impressions of ourselves and our acts impact the people and the environment around us and their well-being.

INTRODUCTION / BACKGROUND

Well-being is defined as the combination of feeling good and functioning well. It is the experience of positive emotions such as happiness, health and contentment as well as the development of one's potential, having a sense of purpose, and experiencing positive relationships. There are 8 dimensions of well-being: physical, emotional, intellectual, occupational, financial, social, environmental, and spiritual wellbeing. To build our overall well-being, we have to take care that all of these types are functioning to an extent.

Nowadays, more than 50% of the population worldwide lives in urban areas. While urbanisation is associated with improvements in income levels, better opportunities for education and access to health care, at the same time, the pressures of urban growth have contributed to the rise of social and health inequalities in cities. In times when urban areas are increasingly populated, there are less green spaces and lifestyles can be quite fast-paced and stressful, it is challenging to achieve and sustain overall well-being.

The complexity of the linkages between urbanization, environmental change and human health and wellbeing, requires a systems approach and engagement of many different societal sectors and all levels of government towards health, wellbeing and urban environment. But what is it that we can do to improve well-being on a personal level and how the permaculture approach can help us with that?

Drawing inspiration from nature, permaculture is all about connections, "joining the dots". Our **connections** with ourselves and each other, our work, our surroundings and nature are vital to our well-being. **Observation** is a key practice, and the basis of all design and action. **Physical and mental activity** are central to permaculture and it is an on-going learning process. **The three guiding ethics of permaculture** include giving back to each other and the earth: Earth Share, People Care and Fair Share.

STEP BY STEP/HOW TO

A Wheel of Wellbeing

1. For introduction, explain to your learners the 8 dimensions of well-being (physical, emotional, intellectual, occupational, financial, social, environmental, and spiritual wellbeing). You can adjust which dimensions of well-being you will take into consideration depending on their age.
2. Tell the learners to draw a wheel of well-being. It can be a circle divided into 8 segments or in the shape of a flower with 8 petals. The center of a circle or flower is "well-being" or "me".
3. For each dimension, tell them to write down what well-being means for them and how each of different dimensions are connected to them.
4. When they complete their wheel, engage the group in a discussion about what well-being represents to them, for each segment. How do they feel about them? What affects their well-being? Do they feel like there is something they miss or needs to be improved? How do people and the environment affect their well-being?

It's important to note everyone has a different definition of well-being. Some segments of the wheel may be more relevant to them than others, or they may feel other factors contribute to their well-being.

5. After the discussion, tell them to make a weekly plan with activities they can do to contribute to every segment of well-being taking into consideration five ways (Connect; Be Active; Take Notice; Learn; Give).

OBSERVE

1. Take some time to observe and notice what it is that makes you feel happy and fulfilled.
2. How do you treat yourself, your family, friends, people and environment around you and how that affects your and their well-being.
3. How people around you define well-being and what is it for them.
4. How the urban environment that we live in affects our well-being.

IDENTIFY

Is there something that is missing, needs to be changed, improved or you need it to let go.

What is it that your friends, family, community that you live in, need for their wellbeing and is there something that you can do and contribute to? .

B Enhance your wellbeing

There are 5 main things you can do to improve your wellbeing. By taking care of yourself, you are taking care of others. Our wellbeing is closely connected with the people and environment around us and if we feel happy and fulfilled we are able to contribute to other's well-being.

Connect

Make time each day to connect with the people around you. With family, friends, classmates, colleagues and neighbors. By staying connected and nurturing these relationships we feel happier and more secure. Connect with nature whether it is in your garden, local park or forest. Go for a walk and engage all your senses.

Be Active

Look for ways to be active everyday. Go for a walk or a run, cycle, play a game, garden or dance. Discover a physical activity you enjoy which suits you. Being physically active can improve our health and wellbeing.

Take Notice

Be aware of the world around you and what you are feeling. Explore, be curious, notice beauty around you. Be present, enjoy and cherish the moment whether you are playing with your friends, having a coffee break with your colleagues, walking in nature or reading a book. Spend some time each day outside observing what's happening around you. Notice things about your environment that you've never seen before, and increase your awareness of your surroundings.

Keep Learning / Be curious / Discover

Try something new. Set yourself a new challenge and learn a new language or skill like gardening and growing your own food. Learning new things can boost our self-confidence and self-esteem. Discover new walks and find some hidden beauty spots in your local area.

Give

Do something nice for someone else. Thank someone. Volunteer or join a community group. Small acts of kindness towards other people, or larger acts – such as volunteering in your local community – can give you a sense of purpose and make you feel happier and more satisfied about life.

LEARNING OBJECTIVES

Knowledge

To learn what well-being is and what the dimensions of well-being are.

Competences

- To understand what well-being represents to us.
- To familiarise the learners on how taking care of the Earth, people around us and ourselves can benefit our own well-being.

Skills

To gain know-how to improve our well-being.

PREPARATION/MATERIALS/TOOLS

- Materials on 8 dimensions of well-being and activities that help to improve them
- Paper, pens and markers

REFLECTION QUESTIONS

- What are the factors that affect my and others well-being?
- Why is it important to understand all segments of well-being?
- What happens if one of them is out of balance?
- How do my actions affect other people's well-being?
- How do my actions affect the environment's well-being?
- What is missing or needs to be improved?
- What can I do and do I need help from others?

MODULE 2.1

URBAN ENVIERMENT

Air quality

DURATION: 1 HOUR

DESCRIPTION

Air pollution has become one of the biggest problems of the modern world because of its effects on human health and the entire ecosystem. Introduce your learners to the factors which affect air quality and how our own actions and lifestyle affects it. Discuss how we can contribute to minimize negative effects of air quality. Good outdoor air quality is fundamental to our well-being and it is important to take actions in reducing its pollution. How we can contribute to that.

GOAL

The goal of this lesson is to teach learners the importance of good outdoor air quality and how it is affected by many substances produced by human activities (e.g., burning of fuels) and by natural sources. Good outdoor air quality is fundamental to our well-being and it is important to take actions in reducing its pollution. How we can contribute to that.

INTRODUCTION / BACKGROUND

With the beginning of industrialization, urban environments faced two challenges at the same time - a sharp increase in population and high pollution produced by an increasing number of industrial plants as well as a growing number of households. In urban areas, traffic is one of the major sources of air pollutants.

Our air quality is affected by many substances produced by human activities (e.g., burning of fuels) and by natural sources (e.g., volcanic eruptions, windblown dust, pollen and sea salt). Air pollution is therefore a complex mixture of gases and particles arising from many different sources.

Air quality affects our health and environment. Air quality can also indirectly affect our economy through its impact on people's health, for instance, higher medical costs and lost productivity through absence from work.
What the sources of pollutants have in common is that in our societies they are fundamental parts in the basic systems of mobility, production and consumption of energy and food. These same systems are the root cause of climate crisis and rapid loss of biodiversity.

LEARNING OBJECTIVES

Knowledge

- To learn to define air quality and air pollution.
- To gain insight about alternative approaches to developing a healthier lifestyle
- To raise the awareness of the importance of small changes in our own lifestyle.

Competences

- To familiarise the learners with the sources and types of air pollution.

Skills

To learn practical ways of reducing air pollution.

PREPARATION/MATERIALS/TOOLS

- Materials on human and natural sources of air pollution
- Materials on renewable energy sources
- Paper and pens

STEP BY STEP/HOW TO

How do we decrease air pollution?

1. Learners brainstorm a list of what can be done to reduce the amount of air pollution.
2. Learners share their ideas and discuss which ideas are easy to implement and which would take more effort.
3. Discuss which alternative energy sources can be used to replace fossil fuels as renewable energy sources.
4. Create lists and plans of ways learners can individually decrease air pollution/pollution.

Observe

Audit yours and your friends and family's habits that can affect air quality

Identify

Write down the list of the activities affecting the most and ideas or alternatives that are easy to implement on a personal level.

REACT

Challenge yourself and your friends and family to take action and commit to one of the suggestions as examples below:

- **Use public transport or car sharing, cycle or walk.**
- **Reduce your consumption of meat and dairy to help cut methane emissions.**
- **Compost organic food items and recycle non-organic trash.**
- **Save energy: turn off lights and electronics when not in use.**
- **Buy groceries from local producers.**

REFLECTION QUESTIONS

- Why is air quality not good in our urban environment?
- Why is it important to reduce sources of air pollutants?
- What happens to humans and the environment when air quality is low?
- How can I improve air quality in my surroundings?

MODULE 2.1

URBAN ENVIERMENT

Surface water management

DURATION: 1 HOUR

DESCRIPTION

This lesson is to explore various options in managing surface water in an urban environment. We find surface water in forms of rivers, lakes and ponds but in an urban setting it is closely connected to runoff waters from roads and roofs which are commonly collected sewage systems and depleted into a river or the sea / ocean.

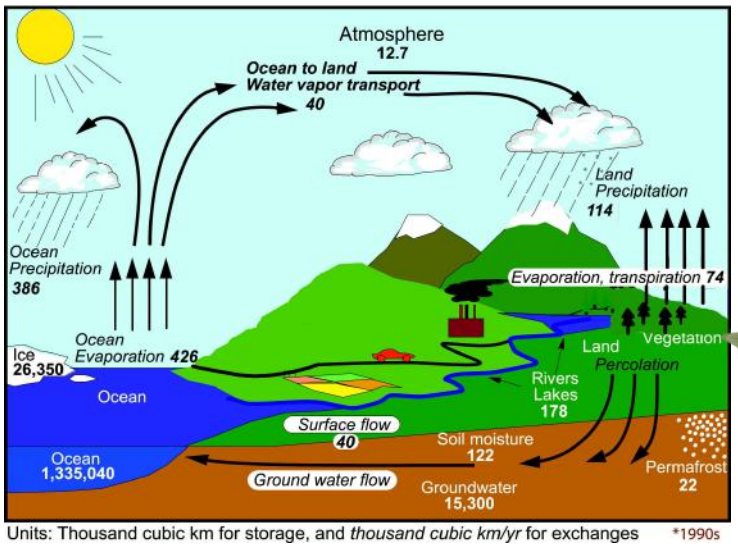
Through this lesson the learners should incorporate their so far gained knowledge to observe what happens with surface water in their habitat and how it can be managed sustainably by using permaculture design.

GOAL

The goal of this lesson is to introduce concepts of managing surface water in a town or city. Learners will be guided to observe and analyse the current condition of surface water in their surroundings to become aware of the advantages and disadvantages of the existing water management principles.

INTRODUCTION / BACKGROUND

Surface water serves a very important role in managing the climate and microclimate of an area through the hydrologic cycle.



The hydrologic cycle

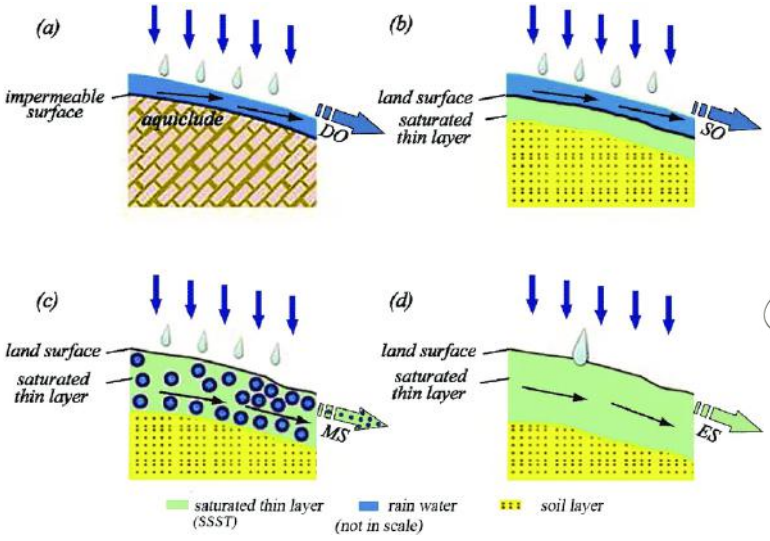
Commonly the first association to an urban environment is concrete and asphalt.

These materials have made our buildings stable and our roads accessible to vehicles.

However, as surfaces made of these materials are not porous, the water that pours on them has to go somewhere.

Being that these surfaces are polluted, especially roads, the water that runs from them carries impurities with it and has a negative effect on the microbiology of the large bodies of water to which it is depleted.

Also this water cannot be used for watering plants or even for cleaning public areas and definitely cannot be recycled back into households for washing.



Surface runoff water depending on finishing layer graphic

Bioremediation of water using "rain gardens". These gardens grow various species of plants which have the ability to clean the water from heavy metals and other pollutants. They will absorb the pollutants and turn them into nutritious elements for their growth, leaving the water clean. This way clean water will run into the large bodies of water and it will not threaten the health of the ecosystem.

This is a good example of turning a problem into a solution; while it is practical and ecological it is also very aesthetic, renews the hydrologic cycle and increases the quality of life of the habitat and the inhabitants.

Rain garden photo (before and after)

LEARNING OBJECTIVES

Knowledge

To learn about water management in an urban environment

Competences

To be able to identify the level of quality of water management in an urban environment.

Skills

To develop the ability to apply permaculture design methods in urban water management.

PREPARATION/MATERIALS/TOOLS

- Water
- Watering can
- Rocks (1mm - 200mm size)
- Sand
- Compact poor soil
- Rich soil or compost
- Tufts of grass (with roots and some soil)
- Pots with holes at the bottom

STEP BY STEP/HOW TO

Surface water runoff experiment

1. Distribute the learners into groups.
2. Give each group one pot with holes at the bottom.
3. Let the learners choose different materials (rocks, sand, soil, tufts of grass)
4. Guide the learners to pick different combinations of materials (2-3 different ones) and place them in the pot layer by layer (make sure that they don't use the same materials and in the same order)
5. Group by group give the learners the watering can to pour water into their pot
6. Observe and discuss the absorbing effects of various materials

REFLECTION QUESTIONS

- What is the hydrologic cycle? What processes does it consist of?
- How does surface water influence the hydrologic cycle?
- What other functions does surface water have in an urban environment?
- What role do plants have in surface water management?
- What does soil have to do with water management in an urban environment?
- What can we do to make surface water management in urban environments more in line with nature and the ecosystem?

MODULE 2.1

URBAN ENVIERMENT

Waste management and composting

DURATION: 3 HOURS

DESCRIPTION

Waste is one of the key problems of modern civilization and an inevitable consequence of our way of life. Increasing welfare brings numerous benefits, but also increases the amount and harmfulness of waste. Waste directly threatens human health, i.e. it indirectly pollutes the soil, water and air, as most of the waste ends up in illegal dumps and becomes non-recyclable garbage.

Talk to your learners about the waste problem and ways of minimizing it by actions and habits we can implement in our own personal life. Through the practical part of making a composter they will learn how they can reduce their impact and turn the waste into a useful product - compost.

GOAL

The goal of this lesson is to introduce learners to the problem of waste and to warn them of the growing amount of waste we generate every day as well as explain how it affects us and our surroundings.

INTRODUCTION / BACKGROUND

With today's way of life, which involves the exploitation and consumption of significant quantities of non-renewable energy sources, the sustainability of life on Earth is in question. Because of development technology, large population growth and the concentration of population in cities, society is increasingly facing a problem of waste management. There is an increase in consumption, which means an increase in quantity waste, especially in cities. Every individual must think about waste management. The task is to establish a comprehensive system of sustainable waste management and protect the environment. The priorities are to avoid and reduce waste in everyday life. If generation of waste cannot be avoided or reduced, then the waste should be reused - recycled or recovered. Waste that can no longer be used rationally should be separated and permanently disposed off in an environmentally sound manner.

To establish functional and good waste management we need to implement the "4R + 3E" concept.

- **4R: Reduce, Reuse, Recycle and Recover**
- **3E: Educate, Economies, Enforce**

Bio-waste can be kitchen waste (food preparation residues), garden or green waste. Bio-waste occupies almost a third of household waste and is a valuable raw material for the production of quality biocompost. Composting is the process of aerobic decomposition of bio-waste to produce carbon dioxide, water, heat and compost, as the final product (in just a few months).Compost nourishes plants, ensures soil aeration, retains water and favors the growth of root plants. Composting is a simple and easy way to turn our biodegradable waste from a problem into a useful product - compost.

LEARNING OBJECTIVES

Knowledge

- To learn what waste management is and why it is important.
- To gain knowledge on how the “4R + 3E” functions.

Competences

- To learn how the 4R + 3E principles can be implemented in everyday life.
- To develop the knowledge and abilities needed to properly separate waste.

Skills

To gain skills in composting in a home, office or in a garden.

PREPARATION/MATERIALS/TOOLS

- Materials on situation and problems due to poorly waste management in your area
- Materials or brochures of your local utility company how and where you can separate and dispose waste
- Materials on DIY composter
- Materials on what materials you can compost, in which ratio and what are possible difficulties and how to avoid or eliminate them

STEP BY STEP/HOW TO

Make your outdoor compost

1. Buy a compost bin or do it yourself from plastic storage containers, wooden pallets...
2. Pick the spot for your compost heap or bin
3. Conduct a research on what you can compost and in which ratio (carbon vs. nitrogen, compostable and non-compostable organic materials)
4. Get the essential ingredients for the compost heap - green (nitrogen) & brown (carbon)
5. Get the balance of brown and green materials right
6. Give it a good airing with regular turning.
7. Monitor your compost (is it too dry or wet, unpleasant odor...).
8. Use the produced compost for your houseplants, garden, public park...

Observe

Observe and take notice of what type of waste you and your family produce.

Identify

How disposal of that waste affects our environment and is there a way to avoid it's disposal?

REACT

Implement changes in your everyday life habits:

- **Think before you buy more new stuff, do you really need it?**
- **Shop local.**
- **Bring your own bag, avoid plastic bags.**
- **Avoid single use items (plastic cutlery, straws, plates, cups...).**
- **Buy second hand.**
- **Repair items before buying new ones.**
- **Grow your own food.**
- **Compost bio-material from your household.**

REFLECTION QUESTIONS

- Why has waste become a huge problem in our urban environment?
- Why is it important to reduce production of waste?
- What will happen to us and our environment if we continue to produce big amounts of waste?
- How can I contribute in resolving this problem?
- What can I do so that people closest to me change their habits and produce less waste?

MODULE 2.1 URBAN ENVIERMENT

Building soil

DURATION: 3 HOURS

DESCRIPTION

This lesson will approach the importance of building soil in an urban environment and introduce various methods to working with soil. The learners will look deeper into soil structure, its compounds and how they can incorporate both innovative and traditional methods in building soil.

Engage the learners in observing soil in their local habitat, examine it closely, gather specimens and realize differences in various types of soil. They should start to notice how soil is managed in their urban environment and what methods can be used to improve it.

GOAL

The goal of this lesson is to have the learners understand the importance of soil in an urban environment, its role in a healthy ecosystem and to introduce them to ways in which healthy soil is built by using local resources and their sustainable management.

INTRODUCTION / BACKGROUND

Healthy soil is the basis and foundation of all life in the terrestrial part of the Earth. As important as soil health is in the agricultural areas where we grow food, it is just as important in urban conditions.

Without healthy soil, there are no healthy plants, neither in city gardens, nor in parks, nor in other green urban areas. Healthy soil is the basis for the growth of vegetation, which provides us with many benefits in urban conditions such as:

- **filters and purifies water**
- **supports the growth of vegetation and enables the circulation of nutrients**
- **regulates the atmosphere and plays an important role in climate regulation through absorbing and storing CO2**
- **determines the system's resilience to extreme events such as drought or flood (the soil hosts 1/4 of planetary biodiversity and is one of the more complex ecosystems)**
- **contains countless macro and microorganisms that contribute to the global cycles of nutrient circulation, and enable life on Earth (according to the FAO, over 95% of food comes directly from the soil)**
- **Soil is a source of calories, carbohydrates, protein, fiber, minerals, oils, and medicines.**

Soil types

To better understand how soil is built it is important to start by getting familiar with various soil types.

Depending on the ***size of the mineral particles***, the soil can be:

- Clay <0.002 mm
- Clay (powder) from 0.002 to 0.05 mm
- Sand >0.05 mm

Often, mineral particles of different sizes are mixed in different proportions, and the type of soil we have is determined with a few simple tests.

Soil sedimenting in a jar

Chemical properties of soil

Soil by its chemical reaction can be acidic or alkaline. It also depends on the acidity or alkalinity of the soil to know in which plants will thrive the most t. The most common soils are of neutral Ph factor, or close to it - slightly acidic or slightly alkaline. Soils of extreme acidity or alkalinity are extremely rare. There are a few different tests which can show the chemical properties of soil:

Litmus paper

Red cabbage test

Plants indicators

Plants As Guide To The Nature Of The Soil (check online resources)

Soil organic component and soil fertility

- Life in the ground
- Microorganisms, mutual relations (elaborate)
- Soil food network (image and elaboration)
- Mycorrhiza, glomalin (image and elaboration)

Soil fertility

- explanation, elaboration, humus…

Methods and ways of soil construction

- Mulch (elaboration)
- chop and drop (elaboration)
- compost (elaboration)

Plants which have useful characteristics for building soil

- plants nutrient miners (elaboration)
- nitrogen fixers (elaboration)

LEARNING OBJECTIVES

Knowledge

To understand the importance of soil quality for food cultivation.

Competences

- To be able to implement methods to improve and maintain soil quality.

Skills

To learn to recognize different soil types.

PREPARATION/MATERIALS/TOOLS

- Projector and projection screen
- Garden shovel
- 1 liter jars (minimum 5 pieces)
- Litmus paper
- Preparation of distilled water in which red cabbage is boiled
- Different compost and mulch samples
- Tables and illustrations on soil types and chemical composition
- Illustration of a network of soil population connections

STEP BY STEP/HOW TO

Exercise 1: What kind of soil is this?

We first explain the method and purpose of the experiment. With the learners, we take soil samples from several different locations, which we then place in jars in which we fill up to a little below the top with water and shake vigorously. Let the contents of the jar settle and observe how the contents of the jar have settled in different layers.
We analyse the layers to determine the composition of the soil at the site where the sample was collected. Based on the analysis of the jar, we make a conclusion about the type and composition of the soil and the amount of organic matter.

Exercise 2: Acidic or alkaline?

With the learners, we take soil samples from several different locations. We first explain the method and purpose of the experiment. In the containers into which the distilled water in which the red cabbage was boiled was poured, we put soil samples and observe the reaction. Based on the observations, we conclude about the chemical characteristics of the soil. Do the same experiment with litmus paper.
During the collection of samples, we analyze the plants growing on the site and relate them to the type of soil that is conducive to these plants.
After these two experiments, we ask why the information we have learned is important to us and bring it into the context of food cultivation and the needs of the plants we grow for different soil types.
We emphasize that the goal is to build the soil by enriching the organic, living humus layer.
We remind you of the previously acquired knowledge of composting and point out the importance of adding compost to the soil in order to enrich the organic layer.
We point out the importance of covering the ground with mulch and ask the learners about materials that we can use to cover the ground. We write the answers on the board and comment on them together. We especially emphasize that there is also live mulch as a form of planting plants that cover the ground.
We bring samples of compost in different phases and humus as well as different materials that can be mulched (especially those materials that learners may not expect) (sheep wool...)

REFLECTION QUESTIONS

- What soil types do we know? Why is it important to improve the organic component of the soil?
- What are the ways to do that?
- Can I personally influence the production of materials that will enrich the soil?
- Where can I use this material?

MODULE 2.1

URBAN ENVIERMENT

Renewable energy potentials

DURATION: 4 HOURS

DESCRIPTION

Through this lesson the aspect of renewable energy potentials within an urban environment will be approached. Renewable energy sources are essential in designing a sustainable or even regenerative future.

Through this lesson we will use permaculture analysis tools to gain insight on the potentials of using renewable energy sources in a city followed by offering several functional solutions which utilise them in a sustainable way and this way reducing CO2 emissions, enjoying all the abundance of energy the planet has to offer for free while respecting the 3 permaculture ethics.

GOAL

The goal of this lesson is to raise awareness of renewable energy potentials among the learners and to provide them with knowledge and tools on how to harvest from renewable energy sources and how to utilise them within their urban environment.

INTRODUCTION / BACKGROUND

The earliest, most "primitive" and worldwide known implemented renewable energy utilisation was from **biomass**. In other words, using wood for fire to produce energy is considered renewable as wood (forest) is a renewable resource. However, we have to be aware of the level at which this resource was/is used because the time needed to chop down a tree or the time period for a forest to regenerate is very unequal to the time at which we can burn the same amount.

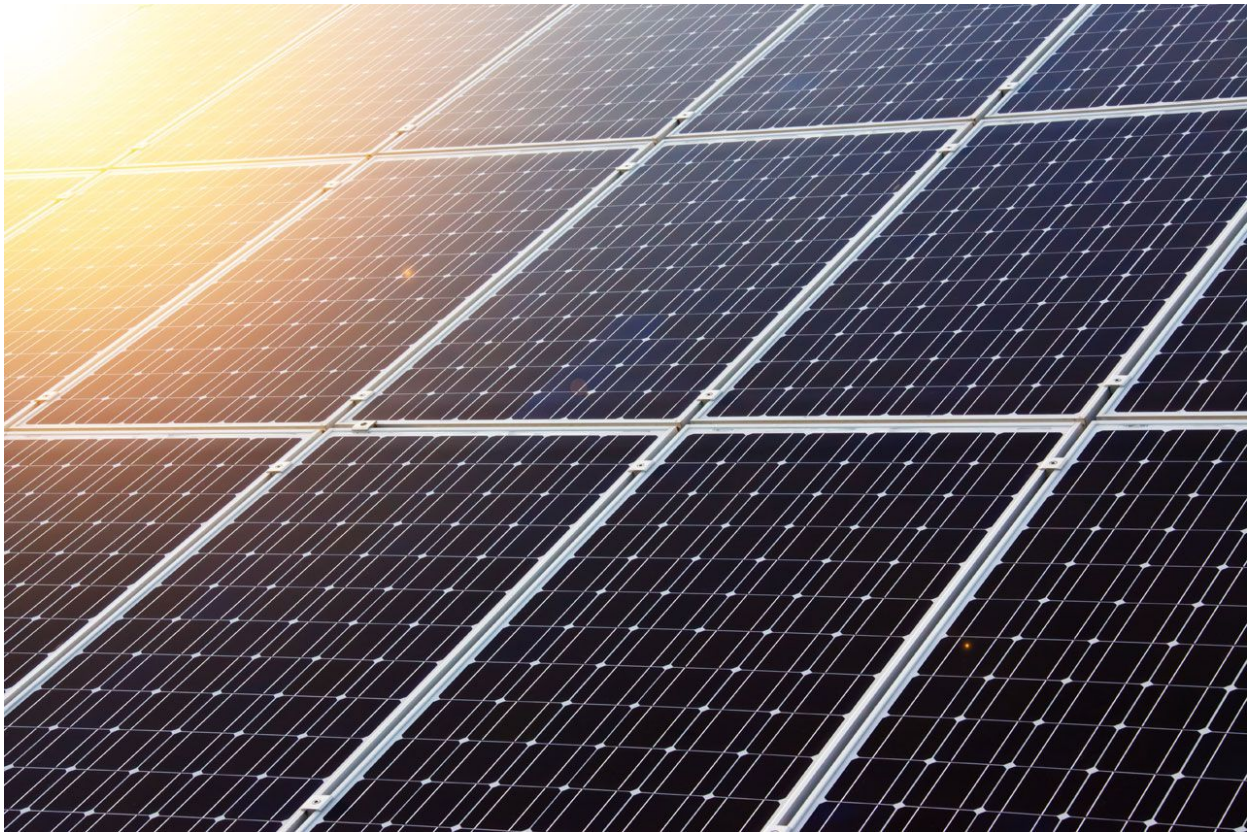
It is important to note, while in theory wood is renewable, it is in no way sustainable to use in a classical way for heating and it does not comply with the permaculture principles or practices. The most obvious reason is that once the wood is burned it turns into smoke and ash - all the energy it produces warms us momentarily, or a pot of food but all the rest just goes into the air, and even more, pollutes it.

A possibility to better utilise the energy of burning wood is to accumulate the heat in a medium which is heat absorbent so it makes the space where we are warmer. A very good example of this are **rocket-mass heaters** which burn wood horizontally and are built as a mass of clay which retains the warmth for hours or even days.

Biomass as a renewable resource can be used in different, more sustainable ways, one of them being **biomeilers** or **compost heaters** which, while making compost, utilises the high temperatures it creates to heat water pipes so that cold water which goes in, comes out warm. This can be an infrastructural challenge for a city - but it is definitely a very permacultural solution that cleverly uses one element - biomass, which has two functions: producing compost and heat. This way we are solving the issue of organic waste (which is abundant in the urban environment) and reducing the usage of non-sustainable energy sources.

Modern society is becoming more and more familiar with the benefits of using **sunlight and sunheat** as renewable resources, one of them being **photovoltaic panels** which generate electricity from light and the other **solar collectors** which passively heat water to use in households.

There are also primitive **DIY solutions** like the solar cooker which can be built out of an old satellite dish. These can be an attraction to a neighborhood or a great addition to the rooftop terrace barbecue.



In contrast to rural habitats where you may need renewable energy resources as your home is not near infrastructure, the urban environment has the infrastructure, but it is also the place where most of the energy is used. This makes it even more important to incorporate renewable energy in cities and towns - **to have the energy produced where it is utilised**. And again, the urban environment has some prerequisites which go in accordance with harvesting from renewable energy sources like plenty of roof surfaces to cover.

When it comes to **transport**, still, most of the transport is maintained through usage of fossil fuels. Alternatives like electrical or bio-fuel powered transport are becoming more and more available and should be utilised as much as possible.

LEARNING OBJECTIVES

Knowledge

To raise awareness of the current condition of energy sources in an urban environment.

Competences

- To develop the ability to identify renewable energy potentials in an urban environment.
- To learn how renewable energy can be implemented.

Skills

To learn to apply permaculture design methods in implementing renewable energy solutions in an urban environment.

PREPARATION/MATERIALS/TOOLS

A thermometer for compost (can be a cooking thermometer as well)

STEP BY STEP/HOW TO

Local opportunities to utilise renewable energy

1. Analyse the amount and sizes of rooftops in your area which can be used to harvest energy from the sun.
2. Analyse winds and air-flows in your area to gain a sense of which positions would be good to harvest energy from the wind.

The heat of biomass

1. Measure the heat in the middle of your compost pile (outdoor) or your composting bin (indoor).
2. Discuss about possible ways of using that heat.

DIY renewable energy

1. Depending on your groups profile / age / experience, explore videos of Do-It-Yourself renewable energy
2. Have the learners choose if they would try and build some of the simple solutions like a wind generator or a solar cooker.

REFLECTION QUESTIONS

- From where do we gain most of our energy (heat, electricity, fuel)?
- Are these sources renewable or non-renewable?
- Why is it important to implement renewable energy in urban environments?
- What are the benefits of it?
- Which renewable sources can be implemented in your environment?
- Are there any boundaries to do it? Which ones? How can they be overcomed?

MODULE 2.2 URBAN GREEN SPACES

Benefits and uses for urban green spaces

DURATION: 1 HOUR

DESCRIPTION

This lesson will support the learners in realising how urban green spaces can be used and what benefits they can bring. When introducing permaculture we have covered its benefits and influences through the prism of the 3 permaculture ethics - the learners should now review this knowledge and apply it specifically to this lesson.

Most of what urban permaculture offers is easily applicable to urban green spaces as those are areas approachable to everyone and with the most tangible effects on both the community and the environment.

GOAL

The goal of this lesson is to integrate knowledge of the benefits of permaculture and apply it specifically to urban green spaces. The learners should become aware of what defines an urban green space and what purpose it can serve. Hence, what uses it can provide when designed and maintained with respect to the permaculture principles and ethics.

INTRODUCTION / BACKGROUND

Urban green spaces have always existed. At first they were merely what was left after an urbanism plan was implemented. Later on, they started being planned as urbanists, sociologists and psychologists recognized how needed these spaces were to the general public.

Manhattan before and after

An urban green space is mostly identified as a park, with grass and trees, but surely there can be more to them. **Urban orchards** produce food for the local community, **urban gardens** are a place of growing vegetables organically and a place to socialize. These spaces are often a showcase for building with **recycled materials**. Urban green spaces can harvest their own rainwater from the surrounding buildings, and energy from **renewable sources** and this way be completely **independent of the city infrastructure** - actually unburdening it.

Besides these very practical uses noticeable to the naked eye - urban green spaces **capture and store CO2** from the atmosphere, and create a more pleasant microclimate in the cities.

Temperature with and without vegetation graphic

LEARNING OBJECTIVES

Knowledge

- To raise awareness about the benefits of urban green spaces.
- To gain insight of the current condition of local green spaces.

Competences

To improve the ability to realise potentials and uses for green spaces.

Skills

To be able to imagine solutions which add value to existing urban green spaces.

STEP BY STEP/HOW TO

Raising awareness of the benefits and uses of urban green spaces

1. Conduct a research on green spaces in your area.
2. How did they come to be, what was there before?
3. Ask the students how they use urban green spaces.
4. Choose a green space nearby and investigate how it is used by people, animals etc.
5. Try and think of new ways to use it.
6. What would be needed to incorporate new ways in using this urban green space?

REFLECTION QUESTIONS

- Why are green spaces valuable to our urban environment?
- Why is it important to maintain urban green spaces?
- Should new urban green spaces be introduced? Where? How?
- What added value do urban green spaces provide?
- How can you affect the creation of new green spaces or adding value to existing ones?

Non-traditional green spaces

rooftop gardens
vertical gardens

DURATION: 3 HOURS

DESCRIPTION

This lesson will explore the ever more popular trend of greening roofs and walls. In this way, we can re-green the large areas that were used during the construction of buildings and restore part of their natural function.

Through the lesson the learners will investigate the positive effects of creating these non-traditional green spaces and also how its implementation in cities can be demanding depending on the climate and how to answer these challenges.

GOAL

The goal of this lesson is to familiarize the learners with various concepts of designing and implementing green areas in non-traditional spaces such as roofs and walls / facades. Also to develop the ability to adequately choose the conditions under which these concepts can be implemented and how to make them work.

INTRODUCTION / BACKGROUND

Green facades and roofs were introduced in Europe some time ago - the famous architect Antoni Gaudí played with the concept of having trees as a part of his organically shaped buildings, growing them on roofs and balconies. Also the artist Hundertwasser did some inspiring works investigating this idea of incorporating infrastructure within green areas. Many famous examples of green walls and roofs exist. Some of them are still living and some are not.

Gaudi or Hundertwasser green building

Green facade Bratislava & Museum in Paris

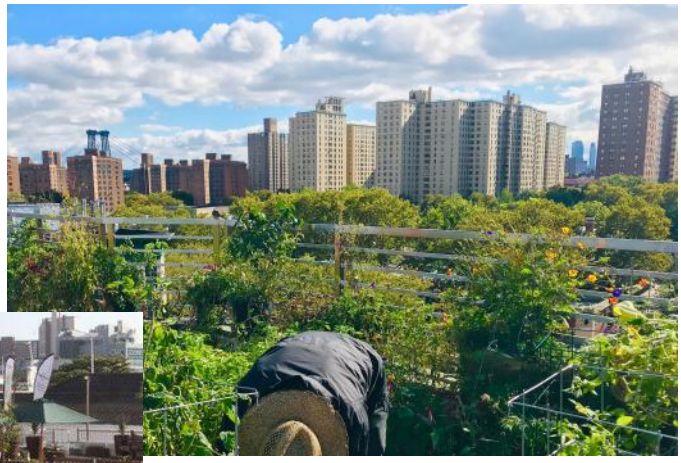
What we want to explore in urban permaculture is implementing this concept not only for its environmental and aesthetic benefits (cooling the building and the city, storage of CO2, increasing evapotranspiration, etc.) but also to **grow food**.

There are several interesting solutions to use the vertical areas to grow food. With just a little bit of imagination and knowing the needs of the plants in terms of how much soil they need, how much heat or cold they can stand and thinking of a simple solution to water them, **vertical gardens** can become a solution to many urban environment problems

Vertical gardens 3 examples (pockets, gutters, planters)

Cities and towns include plenty of spaces which are otherwise left unused and even create problems. For example, **a flat roof surface** of concrete has multiple issues: drawing and containing heat, insulation which has to be fixed every few years, excess amounts of runoff rainwater which is hard to manage and clutters the sewage system etc.

On the other hand, green roofs or roof (rooftop) gardens can serve multiple positive purposes: cooling the building, gathering and using rainfall to grow plants and possibly - **producing food near the source of consumption!** These areas this way also become spaces for building the neighbourhood community.



What is important when planning rooftop and vertical gardens:

1. Be aware of the climate you are living in - not all areas are suited for growing food on the roof - it can become too hot in the summer months and you will need excess watering and shading to have the plants survive.
2. If you're planning to make a whole roof green with adding soil you need to take care of layers of water insulation for the building, statics (soil is heavy), and drainage.
3. If you're growing in containers, choose the right sizes - don't forget that plants, especially vegetables, love a lot of rich soil to grow and contain water
4. Plants growing on facades and on roofs are intensely exposed to sun and wind. Inspect your area's climate to be certain that your plants can withstand the weather.

LEARNING OBJECTIVES

Knowledge

To learn about possibilities, benefits and challenges of non-traditional green spaces.

Competences

- To improve the ability to identify local opportunities to implement non-traditional green spaces.

Skills

To gain skills in designing and implementing non-traditional green spaces locally.

PREPARATION/MATERIALS/TOOLS

1. Wooden boards or palletes
2. HDPE foil
3. Geotextile
4. Branches
5. Gravel
6. Soil and compost
7. Plants
8. Recycled plastic containers
9. Saw
10. Nails
11. Rope
12. Hammer

STEP BY STEP/HOW TO

Our rooftop garden

1. Research if you're allowed to use the roof of a building to make an example of a rooftop garden and if it is a safe roof to walk on. Inspect what position would be good to put a 120cm x 100cm planter in regards to the statics of the building.
2. If number 1 is covered, take your learners to the roof and inspect the same with them
3. Using the material and tools you provided, make a simple wooden frame with a floor with holes in it.
4. Use the isolation materials - HDPE foil and geotextile to make the bottom of the container

- make some holes in the HDPE foil. Geotextile lets water through so no holes are needed.

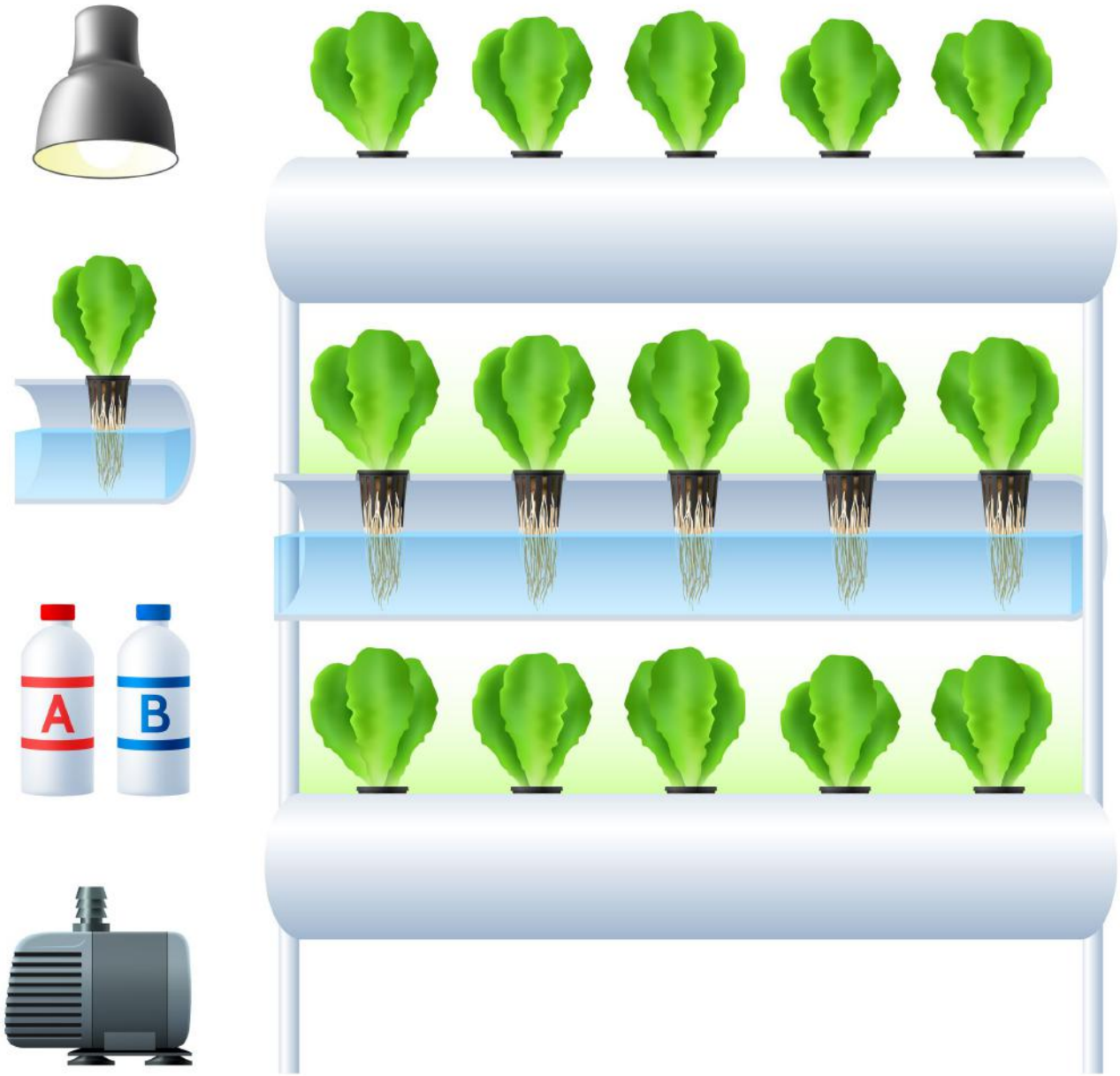
5. Put branches at the bottom, place soil over it.
6. Plant some vegetables
7. Water them.
8. Observe and take care of the plants.
9. Pick some vegetables when ripe and make a salad with the class.

Our vertical garden

1. Open the plastic containers from one side.
2. Fill drill small holes at the bottom.
3. Find a way to tie them together to form what will become a vertical garden.
4. Put some gravel on the bottom of each container.
5. Add soil.
6. Plant some vegetables and/or fruit (adequate to the size of the containers - like strawberries or cress salad, chives, etc.)
7. Water them
8. Observe and take care of the plants.
9. Pick some vegetables when ripe and make a salad with the class.

REFLECTION QUESTIONS

- Why are rooftop and vertical gardens useful?
- How can non-traditional green spaces contribute to the urban environment?
- What are the challenges when designing and implementing gardens in non-traditional spaces?
- Where can rooftop and vertical gardens be implemented in your area?
- How can non-traditional green spaces affect the local urban community?


A
B

MODULE 2.2 URBAN GREEN SPACES

Small green spaces
(yards, balconies)

DURATION: 2 HOURS

DESCRIPTION

This lesson will cover the topic of implementing permaculture practices to create small green spaces to grow food in an urban environment. The learners will incorporate the knowledge and skills gathered so far and integrate them in learning how to design small spaces to make the best use of them to grow food.

GOAL

The goal of this lesson is to have the learners realize that even the smallest spaces in urban environments can be used to grow food and in the process growing a healthier community and individuals while also making a positive impact on the environment.

INTRODUCTION / BACKGROUND

The usual approach to growing food implies large fields or at least gardens of a minimum of 100 square meters. However, in the urban environment usually, community gardens aside, we cannot find plots that large. But this shouldn't discourage anyone from starting growing food in their town or city.

All that is needed are some design skills, imagination, tools and materials. Any small open area in the vicinity of the place where one lives can become a green space / garden. Even the ground cover doesn't have to be soil as we can also use containers. However there are several important points to keep in mind when growing food in a small area. Analysing the area and making a design should be the starting point.

Ground cover

Small yards can be covered in soil (grass, weeds). In this case it is necessary to inspect the depth of the soil as in urban environments because the green areas are often just a thin layer of soil over gravel or concrete. Soil depth can be easily identified by observing the vegetation on the plot. Some plants are deep rooted and some are shallow. If you can identify deep rooted plants that means there is enough soil to start growing food directly. If the soil is shallow it may be best to plan raised beds or containers without the bottom.

In most cases however, the spaces are covered in concrete or tiles and therefore there is no other way to grow food but in containers.

Water

These small urban spaces can be sensitive to excess water due to insulation. It is important to take care of drainage in the containers so that any excess water which is gathered or led away from the surface does not cause damage. Inspect how much water each plant needs not to overwater them and make good drainage if they do not like moist soil. Try and plan to save water as much as possible - use the local resources and recycle water from the sink or AC, for example.

Sun and daylight

Apart from soil and water, plants need sun and light to grow. Small spaces in the urban environment may easily suffer from lack of sun and light. Observe in detail how many hours of sun and how exposed to light is the small green space you plan to make green. In each case we have to design accordingly and differentiate the **heliophytes** (plants which need plenty of light) from the **sciophytes** (plants which can grow in shade or part-shade).

Air pollution

We should take special care of the air quality in the area where we plan to grow food in an urban environment. It is ideal to be at least 100m from any larger roads / highways, or to be higher than the 3rd floor. Also, not all plants draw pollution to them - some can even be used as barriers.

Check online resources for Heliophytes and sciophytes plants and Absorption of heavy metals tables.

Making the best of every square meter

Incorporating vertical gardens into this concept is very useful to create and use more space. Stacking plants near one another can also be needed in this case - this is why it is important to take special care of companion planting when growing food in small spaces. Also it is clever to pick vegetable species which grow quickly and are picked as they grow (like cress salad, chives, nasturtium etc.)

LEARNING OBJECTIVES

Knowledge

To understand the possibilities of growing food in the smallest urban spaces.

Competences

To learn to identify and analyse the existing conditions of the small space which will be designed into a green space.

Skills

To gain know-how needed to design a small green space.

PREPARATION/MATERIALS/TOOLS

- Tape measure
- Paper
- Ruler
- Pencils, pens, crayons

STEP BY STEP/HOW TO

Plan how your balcony/terrace/yard will become food-productive

1. Prepare at least one floor-plan and cross section of a balcony/terrace/yard. Draw in the windows, fence, walls and any existing elements on the balcony.
2. Take photos of the chosen space.
3. Analyse the chosen space with the learners - implement a 5 elements analysis and sector analysis.
4. Distribute the learners into groups.
5. Hand out blank floor plans to each group.
6. They have 30 minutes to make a basic design of the space with sketches showing containers with plants. They should also research/think of a variety of plants they would include in their small gardens. What containers will they use, will they harvest and recycle water somehow?

REFLECTION QUESTIONS

- Why is it important to make small urban spaces green?
- What are the benefits for the planet? What are the benefits for people?
- Can you create a small green space in your school/workplace/home
- How could that affect your work colleagues or family?
- What can you grow in a small green space?
- What is important to keep in mind when designing a small green space?

MODULE 2.2 URBAN GREEN SPACES

Managing and maintaining outdoor green spaces

DURATION: 2 HOURS

DESCRIPTION

In cities, there are different forms of green outdoor areas that are used in different ways and for different purposes. This lesson will discuss the approach to their management and maintenance by applying permaculture principles in order to reduce energy and resources for their maintenance and enable these spaces to perform new functions and contribute to solving various urban problems.

GOAL

The goal of this lesson is to get acquainted with different types of outdoor green areas.
Recognize the basic purpose of outdoor green spaces and the current method of their management and maintenance.
Get acquainted with the possibilities of use and participate in urban green space and personal or civic intervention.

INTRODUCTION / BACKGROUND

In cities, there are green areas for various purposes. Most often, these are parks that are defined by spatial plans and intended for leisure and recreation of citizens. Their maintenance is taken care of by various authorized business entities according to the established management plans which are often neither sustainable nor ecological.

Access to maintenance and interventions in these areas are not possible or have limited access for citizens. Another type of urban green spaces are spaces that are not managed whether they are in public or private ownership and for these spaces there is a possibility of a direct role of citizens in bringing them to a desirable purpose and participation in their maintenance.

The third type are private spaces - gardens that citizens maintain independently and for their own plans and purposes. All these spaces form the city's green areas, and their rules can be used to achieve the goals of sustainability and regenerativeness, and in general to achieve integration into urban units and a better quality of city life.

LEARNING OBJECTIVES

Knowledge

To learn to identify green spaces and their potentials in the immediate surroundings.

Competences

- To be able to identify the method of management and maintenance and their purpose.
- To become aware of the possibility of being a part of the managing and maintaining processes.

Skills

To gain know-how in applying permaculture principles in management and maintenance.

PREPARATION/MATERIALS/TOOLS

- Board/magnetic board
- Chalk, markers
- Projector and projection screen

STEP BY STEP/HOW TO

Introduction (15 minutes)

Ask the learners to list the green areas they know. For each of the mentioned locations or types of location, we ask what its purpose / how it is used. It is desirable to hear the personal experience of the proposer.

We write the answers on the board. In a short presentation, we define what urban green spaces are.

Then we try to define who takes care / is in charge of managing and maintaining the specified area. We try to define what his tasks are and the amount of time invested to complete that task.
We also try to detect spaces that are not in use or are neglected. The following is the categorization according to the purpose, possibilities of use and potentials for the development of a particular location.

Field analysis - Let's change the paradigm - Listen to nature (40 minutes)

We go on an educational walk with the learners, in which the goal is to visit and analyze one of the nearby locations. At a specific location, elements such as size, vegetation cover and found users are analyzed (a survey can be organized and impressions can be collected)

At a specific location, elements such as size, vegetation cover and found users are analyzed (a survey can be organized and impressions can be collected)

The need for the amount of human labor and consumption of resources (energy, water...) is analyzed on specific examples from the location - green lawn, flower beds, selection of trees. An alternative to an individual element is questioned for the purpose of better usability and additional advantages and functions that would be achieved (biodiversity, better water absorbency...). Potential solutions that can be applied with small interventions at the location for the purpose of easier and more efficient maintenance of the green area are analyzed.

Alternative: Presentation on green space management and maintenance (40 minutes)

Through the presentation, examples of management and maintenance of green areas and possibilities for their redesign in accordance with permaculture principles are presented. All elements that would be processed in field work are also processed.

REFLECTION QUESTIONS

- What are the types of urban green spaces?
- Who manages and maintains the city's green spaces?
- Can I personally or as a community member participate in maintenance?
- How can I do that?
- How can they improve existing practices and make them more efficient or replace them with more functional ones?

Uses of different plants for consumption and other uses

medication, wellbeing, aromatherapy

DURATION: 1 HOUR

DESCRIPTION

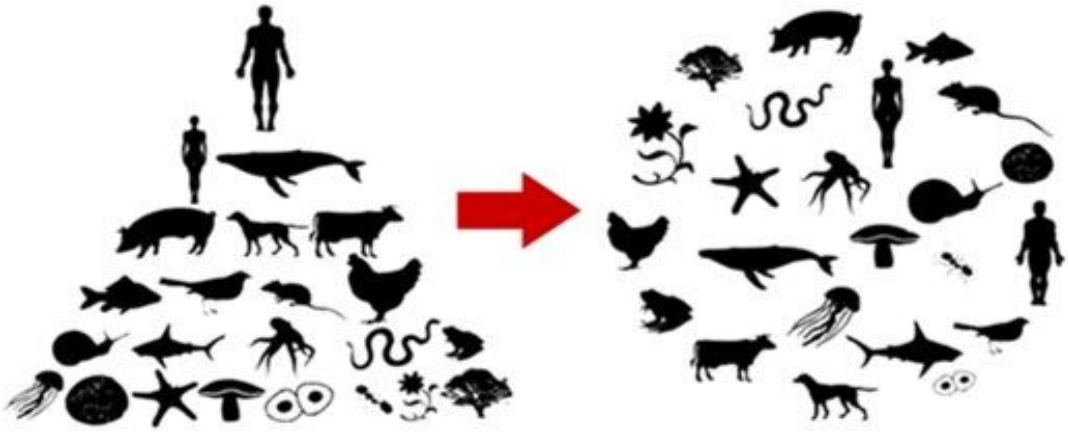
This lesson is to increase the understanding of the possibilities of using plants for various purposes. The learners will further expand their knowledge and ideas on growing food in an urban environment by exploring other various benefits plants can have on humans apart from consuming purposes.

GOAL

The goal of this lesson is to broaden the learner's perspective on how plants can be used and to introduce them to some of the uses for plants besides for food. The learners will gain knowledge on the sorts of medicinal and aromatic plants growing in their urban environment and feel encouraged to research, plant and use them more in everyday life, providing a healthier environment for them and others.

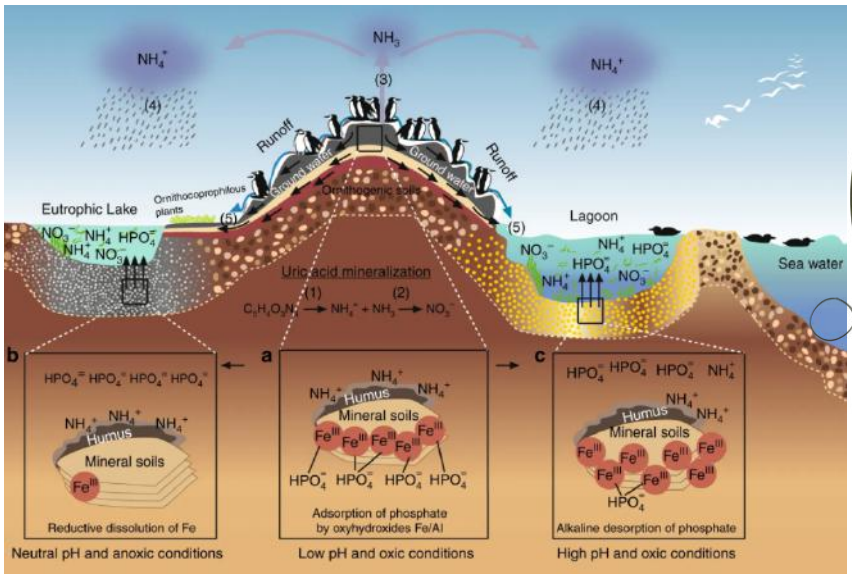
INTRODUCTION / BACKGROUND

The ecosystem generally functions through interaction and combinations of elements within itself and therefore creates a supportive environment for the development of each element which it consist of. Humans are also a part of the ecosystem and are able to use what the other elements within - nature, have to offer to maintain their health on all levels.



Human on the top or as a part of Ecosystem

The nutritional benefits of various vegetables which can be grown in the urban environment are the most obvious reason for their consumption. Calcium, zinc, vitamins, potassium, magnesium etc., are essential for the healthy functioning of the human being, all occur in the natural environment. Plants grow by absorbing and consuming nutrients from the soil, water and air they grow in. Consequently, by consuming these plants, the human body further transforms these nutrients to use them for the healthy functioning of its organs.



Cycle of nutrients in nature

However, plants may be used for **more than just food**. Their health benefits and uses have a wide spectrum - ranging from **medicine** and **cosmetics** to **aromatherapy**. Several plants with these features are easily grown in the urban environment and evenmore, they can serve their purpose in their immediate surroundings.

Depending on the climate, a variety of herbs can be grown in small green spaces and even as a part of vertical or rooftop gardens - for example, rosemary, basil, calendula, lavender, sage, oregano and many more. These plants grown in the vicinity of a home will provide fresh, aromatic air and can be hand-picked for tea and as a spice. They can be distilled into essential oils or hydrolats and be added to cosmetics, aroma lamps or used otherwise. And what is best, they are easy to care for and are perennials.

What makes these types of plants even more beneficial in the urban environment is that they attract bees and other pollinating insects, providing a positive effect on **urban wildlife.**

LEARNING OBJECTIVES

Knowledge

To learn about the nutritive aspects of various plants.

Competences

To familiarise the learners with medicinal and aromatic plants and their uses.

Skills

To develop the ability to identify various herbs and gain knowledge on how to use them in everyday life for cooking and medicine.

PREPARATION/MATERIALS/TOOLS

- Find and pick at least 5 different medicinal and aromatic plants (herbs, flowers) to bring to the class from a safe (non-polluted) environment.
- Water heater.
- Tea filters (from recyclable paper).

STEP BY STEP/HOW TO

The herbs in our neighbourhood

1. Show the plants (herbs) you picked to the learners.
2. Let them feel and smell the herbs.
3. Discuss if they are familiar with them and if they know any uses for them.
4. Hand out tea filters to each learner.
5. Let them pick a combination of herbs they like to fill the filters and make tea.
6. Enjoy the herbal tea and discuss its benefits
7. Give a task to the learners to research herbs and medicinal plants in their own neighbourhood and find out about their uses from their older siblings, the internet or from books.

REFLECTION QUESTIONS

- How do nutrients circulate in the ecosystem? What role do humans have in it?
- How are plants beneficial to human health? What uses can they have?
- What medicinal and aromatic plants can we find in your surroundings?
- Are these plants good to grow in an urban environment and where?

MODULE 2.3 URBAN FARMING

Community gardens

DURATION: 6 HOURS

DESCRIPTION

In this lesson, the learners will be introduced to the concept of urban social gardens and how such gardens function in urban environments. How to establish an urban garden and what are the possible forms of an urban garden with regard to its purpose and method of management. Special attention will be paid to the social aspects and functions of urban gardening and its role in community building. Emphasis will be placed on social / shared urban gardens. The urban garden as an element of urban green areas will be analysed through the prism of permaculture design both from the aspect of analysis and the elements of which it consists and their layout in space.

GOAL

The goal of this lesson is to introduce the importance of urban social gardens and the procedures essential for their establishment, management and participation in its work. The learners will be encouraged to engage in existing or establish new urban gardens and connect with a like-minded community. In this process, they will be encouraged to approach the problem from the position of a permaculture designer.

INTRODUCTION / BACKGROUND

In modern urban environments, citizens face a lack of green areas suitable for rest and recreation. The global context of climate change leading to extreme climate events is particularly reflected in cities with special microclimatic conditions. Utilising existing or creating completely new plots, the urban environment can be used meaningfully to create green areas. The establishment of urban gardens responds to several problems:

- Quality of space by creating new community park spaces and increasing their aesthetic quality.
- Soil quality improvement through organic and regenerative gardening approaches of soil renewal.
- Air quality, urban biodiversity and microclimatic characteristics through planting a variety of plant species, absorbing and storing CO2.
- Water management by gathering and using rainwater and increasing green surfaces which are water absorbent.
- Waste management by reusing organic waste through composting and practicing upcycling methods for non-organic materials.
- Social life is encouraged through organization and self-organization of citizens in participation in the work and management of urban gardens.
- Ecological footprint is reduced in general as a result of maintaining sustainable practices.

Urban gardens are a kind of polygon in which all the above benefits can be realised and further promoted. Successful practices of urban gardening can be found today in many European and world cities; these examples are models that need to be analysed and applied in a local context.

LEARNING OBJECTIVES

Knowledge

- To learn about the concept and functions of an urban garden.
- To gain insight on the problems that are solved through various functions of the urban garden.

Competences

- To learn to identify different models of urban garden use and management.
- To become aware of the social component of civic self-organization and participatory decision-making.

Skills

- To be able to Indicate alternative forms of use of urban spaces, especially green areas.
- To gain skills on how to apply a permaculture approach to urban gardening and urban gardens.

PREPARATION/MATERIALS/TOOLS

- Board / magnetic board, chalk / markers
- Projector and projection screen
- Map of the city where the course is taking place (or some other locations)
- Literature on urban gardens - qualitative research on user experiences.
- Spatial plans of the city with marked zones.
- A list of five-element analysis (in form of a poster or written on the board)
- Papers, pens and crayons.
- Links to literature and literature on gardening, urban gardening and the organization of urban gardens.
- Field work preparation:
  - Excursion to an urban garden - if it's available.
  - It is also possible to visit an already formed city park or some other green area.
  - Agreement to present work and activities in the garden.

BONUS: Contacts and list of existing urban gardens in the vicinity. https://www.gardeniser.eu/en/gardeniser-pro

NOTE: Divide the lesson into two parts where at the first lesson students will be introduced to a theme and theoretical part, be informed and handed maps and spatial plans of the urban garden or city zone where the urban garden could be established. The second lesson is a visit to a garden.

STEP BY STEP/HOW TO

EXERCISE 1

A The food I eat (40 minutes)

Objective: To raise awareness of the origin of the food we consume and ways of obtaining it in an environmentally and socially acceptable way, one of them being from the urban garden.

Question for reflection: Where does the food I eat come from?

1. Learners write down a list of foods they use in their everyday diet - special mention should be made of foods they use more often.

2. The results are grouped and written on a board.
3. When identifying recurring foods in most learners, the question arises as to how they obtain them and how and where those foods are produced.

STEP BY STEP/HOW TO

A

Observe

Through discussion, ecological global problems of food production (conventional production that includes pesticides and herbicides, the ecological footprint of transport, low incomes and unfair practices towards workers) and reduced nutritional value of such food are observed and connected.

Identify

We single out foods that can be produced independently in an urban context and connect them with previous lessons and the whole of urban food production. We point out that the urban garden is one of the places where, as a rule, we can grow or obtain a larger amount of food from it (than from growing on a balcony or roof). We also point out the social and economic components of purchasing food from local producers and connect it with the lesson about the Community.

We conclude that we have answered the problem of food production and procurement, and in the next activity, we are looking for what other problems we are responding to with a functional urban social garden.

B

EXERCISE 2

Presentation on good practices of urban gardening

(60 minutes + 20 minutes of reflection on the topic)

Objective

To show the contexts in which urban gardens are created and to illustrate what urban gardens look like and function in different cities. Different definitions of an urban garden and different purposes and user groups are presented.

Prior to the presentation, a question is asked about the benefits of social gardens and the answers are written on the board, then during the presentation, they are illustrated with examples and supplemented with other benefits:

- *contribution to local self-sustainability*
- *preservation of biodiversity*
- *promotion of organic food cultivation*
- *contribution to preservation of local varieties and food sovereignty*
- *reduction of ecological footprint (personal and collective)*
- *mitigation of heat islands effect*
- *contribution to hydrological cycle renewal*
- *availability of healthy food*
- *education*
- *development of ecological awareness and worldview*
- *personal development*
- *contribution to a healthier environment*
- *contribution to a more beautiful and richer image of the city*
- *place of rest and recreation*
- *encouragement of physical activity*
- *improvement of psychophysical condition*
- *connection with nature*
- *development and strengthening of community and civic solidarity*
- *therapeutic and rehabilitation dimension*
- *inclusion of marginalized and vulnerable groups*
- *inclusion of individuals with special needs*
- *identification with space*
- *development of a culture of cooperation and participatory decision-making*

C

EXERCISE 3

Visit an urban garden or location suitable for an urban garden

(3 hours)

Objective

To see how the urban garden works in practice / the potential of the space for the establishment of an urban garden.

C.1. A visit to an urban garden includes:

1. Conversation with the manager of the urban garden and a presentation of the model of management and organization of work applied in the garden.

2. Tour of the garden with presentation of the elements of the garden and activities / programs that take place in the garden.

3. Conversation with some of the users of the garden through which the learners will be acquainted with the experiences of participating in and working in a social garden.

Optionally, learners can participate in some of the work activities that take place in the garden or participate in the preparation and consumption of meals if there is such a possibility.

C.2. If an urban garden does not exist, a location that has the potential to become an urban garden is selected and a site is visited to analyze the possibilities for establishing an urban garden. (It is necessary to have several locations in preparation, one of which is chosen for this activity). The location is analyzed by using the familiar permaculture analysis tools.

STEP BY STEP/HOW TO

EXERCISE 4

Reflection on the study / field visit

(45 minutes)

Based on experiences and recorded data (notes from visits to the garden / location and a pre-recorded list of useful functions of the social garden) and analysis of 5 elements, learners conclude which of these benefits and to what extent the visited example satisfies.

Also, based on the site plan / draft, learners list the elements they would include and argue the locations of the elements and the connections between them. In particular, the relationships between garden users and the ways of involving the wider community are analyzed.

Additional exercise

It is possible to make a decision-making exercise (related to social permaculture) which analyzes the potential users of the garden and the management model among the learners. This exercise is especially recommended if you are not visiting an existing garden but talking about establishing a new garden.

REFLECTION QUESTIONS

- Why are social gardens relevant in urban areas?
- Why is the social component of urban gardens important?
- What are the areas that could become an urban garden currently used for?
- Do I want and do I have the opportunity to participate in the work of an existing urban garden?
- Do I have the opportunity to participate in the establishment of an urban garden?
- What would happen if an urban garden was established in my neighborhood? How would my fellow citizens react?

MODULE 2.3 URBAN FARMING

Tools and practices in urban farming

(and hydroponics / aquaponics)

DURATION: 1 HOUR

DESCRIPTION

This lesson will look at the practical side of urban farming. Once all the necessary analysis is conducted and the design is implemented it is essential to master various tools and practices which will help maintain what was created in a sustainable way. It would be beneficial to become aware of these tools and practices as a part of the design so that the learners can design with this in mind.

GOAL

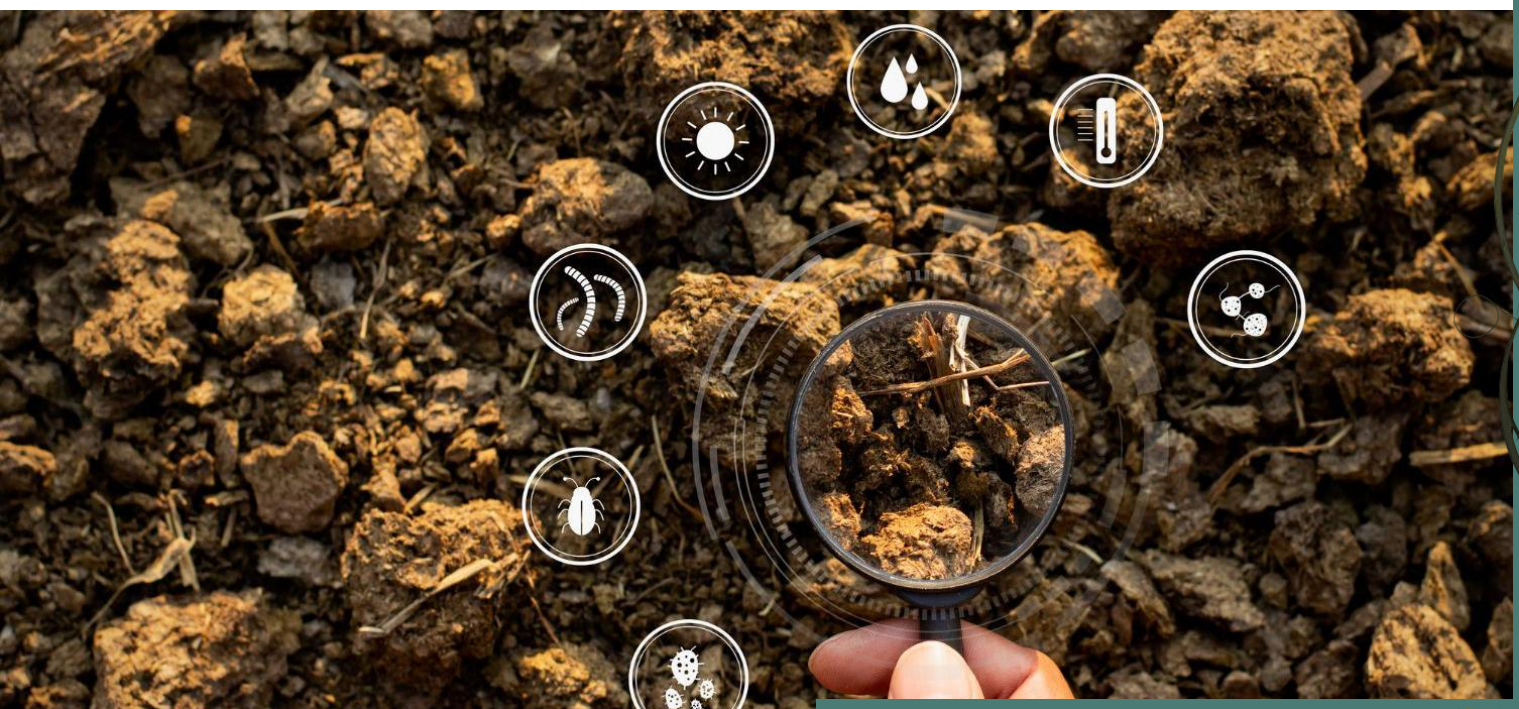
The goal of this lesson is for the learners to gain insight into practical tools used as a part of sustaining an implemented permaculture design. They should become aware of the importance and how to practically use the system of stacking functions within elements as learned before as part of design tools.

INTRODUCTION / BACKGROUND

Once an urban garden is established, regardless if it's a vertical garden, a yard, balcony or a community garden, permaculture practices and tools can be implemented to sustain the garden. Having a precise design before the implementation is a prerequisite. This design should cleverly implement the rule of **one element = multiple functions**. This rule, once applied in practice, ensures that **energy and resources are saved** and less space, which is scarce in the urban environment, is used.

Companion planting

When dealing with areas with less space to plant which means different plants will have to be close to each other, it is very important to take care of companion planting. This means that we have to research which plants (vegetables, flowers, herbs) are **good / bad neighbours**. This way we can create areas where plants protect each other from disease and pests and save space.



A common technique used with companion planting is combining root, leafy and tall plants like carrots, basil and tomatoes or the 3 sisters: pumpkin, sunflower and beans.

The 3 sisters

Liquid fertilizers and compost "tea"

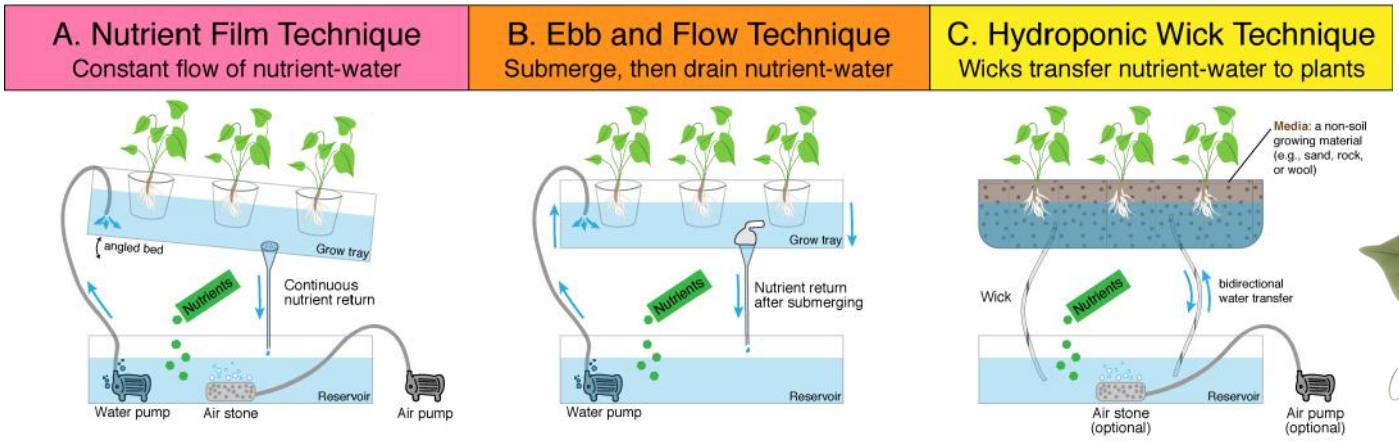
If the garden is made in containers and there's not so much soil for the plants to grow in, a common practice is using organic liquid fertilizers which can be made at home (from plants) or store-bought. This way, we don't have to add new nutritious soil to our containers regularly, but rather help out the plants by watering them or applying diluted liquid fertilizer to their leaves by spraying.

If we're making our own compost, we can gather the compost "tea" which pours at the bottom of our compost bin and use it to fertilize our plants in the same way as with liquid fertilizer.

Liquid fertilizers

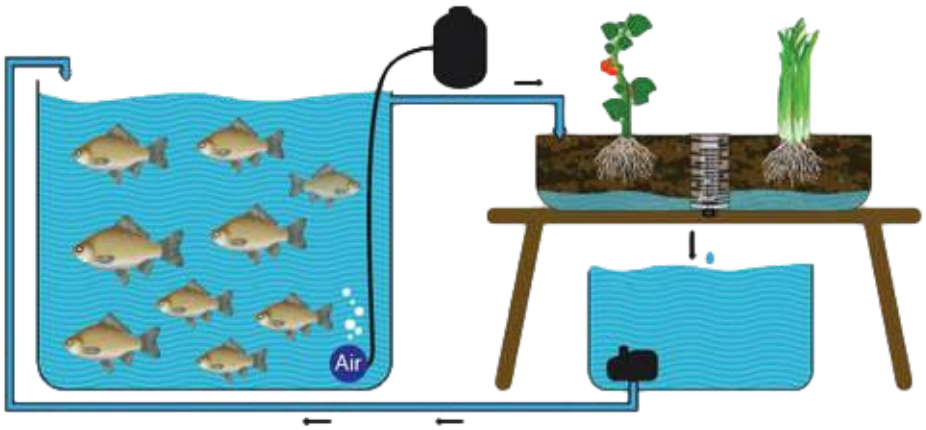
Hydroponics / Aquaponics

If we want to step up our food production in an urban environment by lowering our needs for resources, we can assemble a hydroponics or aquaponics system. **Hydroponics** is a technique of growing plants without soil - in water. This means that the plant will gain all the nutrients it needs from the water which is enriched with these elements.



Hydroponics system

With **aquaponics**, there is an additional element to the system - **fish**. As the fish are given high protein nutritious food, the fertilizer they release into the water makes the water highly nutritious as well. With aquaponics, the water is used to grow plants in the same way as with hydroponics, but we are also gaining from having an additional food source - the fish. Also, it is common that this water is taken and that soil-based plants are watered with this highly nutritious water or the fish castings are gathered to add to the plants.



Aquaponics system

LEARNING OBJECTIVES

Knowledge

To learn about the possibilities permaculture brings to an urban environment and how it can be implemented in different occupations.

Competences

- To learn to implement permaculture tools and practices in designing and implementing urban gardens.
- To gain encouragement to start an urban garden.

Skills

To gain know-how on using a variety of tools to create sustainable and holistically planned habitats.

PREPARATION/MATERIALS/TOOLS

- Companion planting chart (large print or on the projection screen)
- Pieces of paper and pencils / pens / colors

STEP BY STEP/HOW TO

My own companion garden

1. Have the companion planting chart visible to the learners.
2. Divide the learners into groups of 4
3. Hand them pieces of paper and pencils
4. Have the learners plan out their own 1m x 1m garden in a container with at least 3 different varieties (flowers, root, leaf, tall / vine plants)
5. Each learner from the group should pick one plant to research:
   its growing conditions and needs, size, nutritive facts, time of seeding / planting / picking

REFLECTION QUESTIONS

- Which tools and practices in urban farming can be implemented in our environment?
- Why are these tools and practices useful?
- How do hydroponics and aquaponics contribute to growing food in an urban environment?
- Why is companion planting important?
- Could you start a small urban garden in your school/workplace/home now that you know some of these tools and practices?

Indigenous and non-indigenous planting and considering the right plant for the right location

DURATION: 2 HOURS

DESCRIPTION

This lesson will point out the importance of choosing the right plant for the right location. Different plants prefer different growing conditions and not every plant is suited for every location, especially in an urban environment where various urban elements and nature interact. Also, it is important to be aware of the local flora-indigenous species and plan the planting accordingly.

Analyse the surroundings with the learners, and ask them to try and get familiar with the indigenous plants their family or neighbours might know about. Encourage them to observe how a specific plant affects the urban environment when it is growing.

GOAL

The goal of this lesson is to increase the learners' ability to choose a location for planting depending on how the plant interacts with its surroundings. The learners will also gain insight into indigenous and non-indigenous planting.

INTRODUCTION / BACKGROUND

Each location where new green space is planned has its own requirements, and not every plant is suitable for every location. Planting should be done by first analysing the environment and its needs and choosing the plant accordingly. It is very useful to put everything on paper in a design (floor-plan and cross-section) to get an overview of the potential positions of the plants and their relations with each other and their surroundings.

Surroundings

It is best to start with an understanding of what is happening around the area where the plants will be planted: is it close to the road / street / pavement, is there concrete or asphalt nearby, and how big is the plot. The type of plant we use might greatly influence the area we plant it in, which means we should have good reasons for each plant we decide to make part of our urban environment.

Perennial / seasonal

Depending on the purpose of the urban green space, the available resources and the existing needs, as well as wishes that are to be met, can guide you to choose between perennial or seasonal plants for any given location. Of course, it can also be a combination of both and it mostly depends on who will be caring for the plants and what is the long-term plan for the location. Trees and shrubs are perennials, while seasonal plants are mostly flowers and vegetables.

Evergreen / deciduous

When it comes to deciding if a plant should be an evergreen or deciduous plant, again a combination of both can be chosen. However, we should have a clear idea of what we want the green space to be. With evergreens, obviously if they reach high they will provide shade all year round and if that is what is needed then that is good. However, in some other cases we might need a deciduous plant, to have more sunlight in the colder months. In a clever passive design, evergreens are mostly planted to the north to serve as windbreaks, while deciduous plants are planted south of the buildings, gardens, parks etc.

Size and shape

When considering a plant's size, we have to create a plan in advance. If we are planting a young tree, we should be aware that it will grow in size, and become both taller and wider. Future larger trees should be planted far enough from one another so they have space to grow, and they should not be planted too close to the buildings and roads. Also, smaller trees and fruit trees need space to develop their canopy, and their canopy may prevent passage along the paths or to other elements.

Indigenous / non-indigenous

By observing the surroundings, we may easily identify which plants have always been there - they are called indigenous plants. These plants are easily adaptable once they are planted because they are used to environmental conditions. Also, they might not need as much care as other plants once they are well-rooted and start growing.

On the other hand, we can notice non-indigenous plants everywhere as well. They sometimes turn into invasive species which are hard to get rid of once they start spreading around. This is an important reason to think twice before planting a non-indigenous plant. However, sometimes it can be even useful to introduce a new plant species to the environment as they can have beneficial effects. In that case, we need to be certain that they are not invasive and will not interfere aggressively with the existing environment creating a disbalance.

LEARNING OBJECTIVES

Knowledge

- To learn about the local flora.
- To gain knowledge of various specifics of different plants.

Competences

To gain the ability to analyze a location from the perspective of whether it can be improved by the introduction of new plants in the area or not.

Skills

To learn to design urban green spaces based on a thoughtful choice of plants.

PREPARATION/MATERIALS/TOOLS

- Books on local flora
- A herbarium
- Paper bags
- Newspaper

STEP BY STEP/HOW TO

Make a herbarium

1. Take the learners for a walk in your immediate surroundings
2. Pick as many plants as you can find into paper bags (leaves and stems, for trees only leaves)
3. Identify the plants using books, apps or other. Identify if they are indigenous or non-indigenous.
4. Find out as much as you can about the plants and write it down
5. Put them between sheets of newspaper
6. Press them in a book together with the paper with the name of the plant and description
7. Leave the plants to flatten and dry in the books for a week
8. Arrange them into a herbarium

REFLECTION QUESTIONS

- Why is it important to analyze the location and its characteristics before planting?
- What indegenous and non-indegenous plants grow in your area?
- What important characteristics of plants should we consider before planting?
- What effects can plants have on an existing or planned urban green space?
- How do non-indegenous plants affect the environment?

The environmental needs of different types of plants and the benefits/disadvantages of different plants and their environmental impact.

DURATION: 1 HOUR

DESCRIPTION

Besides choosing a good location for a plant, so that it fits where it is planted, it is also very important to choose the right location according to the plant's environmental needs such as microclimate, soil type, exposure to sun etc.

Observe the environment with the learners to help them become aware of the condition of specific plants in regard to the conditions they are growing in. Start to notice if a plant looks like it is developing well or not; what conditions is it growing in?

GOAL

The goal of this lesson is to guide the learners into the world of plants in a way that they begin to understand their various needs depending on their species and the environment in which they will be / are planted. Also, this lesson will increase the learners' awareness of how a plant can affect the environment it is growing in in a positive or negative way.

INTRODUCTION / BACKGROUND

Not all plants like the same growing conditions, which makes it essential to research the environmental needs of any specific plant. Use the permaculture analysis tools to determine the characteristics of a location before deciding what to plant. The 5 elements analysis and sector analysis will reveal all the necessary parameters which should be taken into consideration.

Moreover, having a clear understanding of the environment will provide guidelines on how and which plants can either benefit or undermine the location's quality on various levels. The following aspects should be thoroughly analysed to be certain **what the plant needs from the environment and vice-versa.**

Climate / microclimate

Being aware of the local climate is very important. We can identify the climate with a climate atlas and find where we plan the planting. Furthermore, each location creates its own microclimate depending on all parameters mentioned below. For instance, a shaded location with surface water will have a different microclimate from the one which is on a sunny slope.

The right plant in the right environment can add several benefits and qualities to the area by influencing the microclimate hence creating more moisture in the air, producing more oxygen, gathering CO2, etc.

Exposure to sun / light / shade

It has already been mentioned that some plants are heliophytes (prefer light) and others are sciophytes (prefer shade). There are also plants which can grow in partial sun/shade. Exposure to sunlight is also very important for some plants, especially if they bear fruit.
In regard to sun/light/shade can impact the environment in a positive and negative way. For example, it can have a good location for itself to grow in full sun, but if the wrong plant is chosen, it can create shade on other, smaller plants which would suffer from lack of sunlight. In a different case, the plants behind it may prosper in full or part shade.

Slope of the terrain

A sloped terrain can mean threats of erosion, therefore, a deep-rooted plant can benefit soil retention. On the other hand, if a shallow-rooted plant is chosen it can be dangerous to the surroundings if it tips over, for example under the influence of a strong wind.

Soil type

Plants are susceptible to the soil they are growing in. A soil type analysis should be carried out to determine its chemical properties, organic components, depth, structure, etc. Plants are to be chosen to meet the conditions of the soil. Soil type can only be influenced to an extent by applying methods of changing its properties - these methods should be applied only as a last resort. Plants should rather be chosen so that they can successfully grow in the type of soil which is already there.
However, building soil is a beneficial method and it never hurts to do it. Also, by planting nitrogen-fixating or nutrient-mining plants we can benefit soil quality in a natural and non-aggressive way.

Water

Certainly all plants need water to grow. However, some need less and some need more. The drainage of soil plays an important part as well. Before planting we should be aware if the location has access to water and the quality of it. Also, if there is no water access, is there surface water that we can use, or rainwater that can be harvested to water the plants. Some plants won't need watering, and possibly they won't even grow well if there is too much water.

Wind and air circulation

Some plants are very sensitive to winds and will have trouble developing in an area exposed to wind while others can withstand the strongest ones and even serve as windbreaks. When positioned correctly a combination of tall, evergreen trees which will protect the smaller, deciduous plants can work very well.

Air quality

Exposure to polluted or contaminated air can influence some plants so much that they suffer and never grow. However, there are also plants which can withstand pollution or even clean the air by absorbing the contaminants and turning them into nutrients.

Community

When designing a public urban space, the needs and wishes of the community should be the centre of all analysis and an essential guideline to how we will approach creating this urban environment so that it serves its purpose to the community. It is the same if the space is private, as in that case, the community are all of the owners / users of the space.

Designing the social aspect of our urban environment should be a two-way process. We should answer the questions - what can the community do for the plants (skills, resources etc.), and what can the plants provide for the community? A good design will put the needs of both in good balance.

LEARNING OBJECTIVES

Knowledge

To learn about the environmental needs of different types of plants.

Competences

To understand how different plants can influence their environment in a positive or negative way.

Skills

To gain skills in analysing and designing the urban environment in regards to the needs of plants.

PREPARATION/MATERIALS/TOOLS

- Prepare a presentation on analysing a location by using the permaculture analysis tools.
- Discuss with the learners about all of the aspects of environmental needs plants have and how they can respond to the needs of the urban environment.

REFLECTION QUESTIONS

- Why is it important to analyse the environmental needs of plants before planting?
- How does permaculture design help in making a good planting plan?
- What are the aspects of environmental needs of plants?
- How can plants affect the urban environment depending on which plants are chosen?

MODULE

3

INDOOR URBAN PERMACULTURE

9 lessons – **20** hours

What is Indoor urban permaculture?

DURATION: 1 HOUR

DESCRIPTION

This lesson will discuss the application of permaculture analysis and principles to indoor design in urban environments. The types of spaces located in cities will be listed and their existing purpose and ways they are used will be analysed. Attendees will also be introduced to tools for analysing the current situation. Various examples will be presented to illustrate how to improve the quality of life in such areas, while at the same time solving some of the problems such as waste disposal or food production.

GOAL

The goal of this lesson is to point out the possibilities of better use and management of indoor urban spaces to improve the quality of life in the city by meeting different living needs and solving existing problems.

INTRODUCTION / BACKGROUND

The largest part of the world's population lives in cities, and this number tends to increase. In recent times, when people are becoming aware of the environmental challenges posed by climate change, there is a growing need for education and a different paradigm of organisation and use of urban spaces.

The characteristic of city life is that a large number of residents who spend most of their time indoors are concentrated in a relatively small area. They live and spend their free time in apartment buildings, work in office buildings and spend their leisure time in various shopping, entertainment or sports centres. All these spaces, from personal housing units to large public spaces, have the potential to shape their interior in such a way that the spaces are healthier and more comfortable for the stay of their users, to create added value either by food production or use in various socially useful purposes. By designing such spaces to become places where joint projects will be strengthened through community strengthening, by organising various forms of reuse of waste generated in urban conditions, we raise the quality of life in urban areas

LEARNING OBJECTIVES

Knowledge

- To learn about different types and characteristics of indoor urban spaces.
- To familiarise with existing examples of good practice in the use of urban spaces.

Competences

To learn how to use indoor urban spaces.

Skills

To gain skills in application of analysis and permaculture principles to the design of urban spaces

PREPARATION/MATERIALS/TOOLS

- Board / magnetic board, chalk / marker
- Projector and projection screen

STEP BY STEP/HOW TO

At the beginning of the lesson, participants are encouraged to list the indoor urban spaces they know, and after writing them down on the board, they try to determine the purpose and basic characteristics of the mentioned spaces. We list the dichotomies as private / public, residential / non-residential and we encourage them to give personal impressions of the use of these spaces.
In this part we use the opportunity to repeat the tools of permaculture analysis and principles (either through a call to list them on board, or through a short presentation) and try to connect them with the analysis of previously mentioned spaces: analysis of users, time spent, impact of certain spaces to us (physical and other sensations that we experience in these spaces and the needs that we satisfy in them).

The first part concludes with the conclusion that with good analysis and application of permaculture tools, indoor spaces can be re-designed in a way that will satisfy many more functions and can be part of a solution to more problems we encounter.

The second part of the introductory lesson in this topic is the presentation of good practice in the use of urban indoor spaces and the announcement of topics that will be covered in this module. In the presentation it is necessary to use concrete illustrations and photos of examples with the indicated interventions and the purpose of the mentioned interventions

REFLECTION QUESTIONS

- What are the types of urban indoor spaces?
- What are the ways spaces are used?
- Is there a better way these spaces could be used?
- How can we know this and how to achieve it?
- What problems can we solve by changing the approach to the use of urban indoor spaces?

Wellbeing indoors

Indoor air quality, acoustic quality, indoor materials, SBS

DURATION: 2 HOURS

DESCRIPTION

This lesson will analyse several aspects of indoor well-being, examining how the interior habitat influences humans and why it is important to make it safe, comfortable and healthy. The aspects covered are: air quality, acoustic quality (noise) and various materials we encounter in our indoor environment.

This lesson also introduces learners to the term "sick building syndrome" (SBS). SBS is a condition in which building occupants experience negative comfort and health effects that appear to be linked to time spent indoors. Learners will research and learn about the indicators, causes and solutions to the sick building syndrome.

GOAL

The goal of this lesson is to initiate a new point of view towards our everyday life indoors. To analyse how much impact can we make on our quality of life and well-being in the place where we spend a lot of our time. The lesson will familiarise the learners with some of the main aspects of indoor well-being as well as the measures that need to be taken to develop it for the better.

Another goal is to teach learners about SBS and to learn about the possible symptoms and how to recognise them. To teach them about the possible causes and ways to decrease risk factors for sick building syndrome. How poor air quality of indoor spaces can affect people and the importance of indoor green space in removing and preventing SBS.

INTRODUCTION / BACKGROUND

The modern lifestyle implies that each person spends at least 70% of their day indoors - sleeping, working, eating, exercising - all of these activities typically happen indoors.

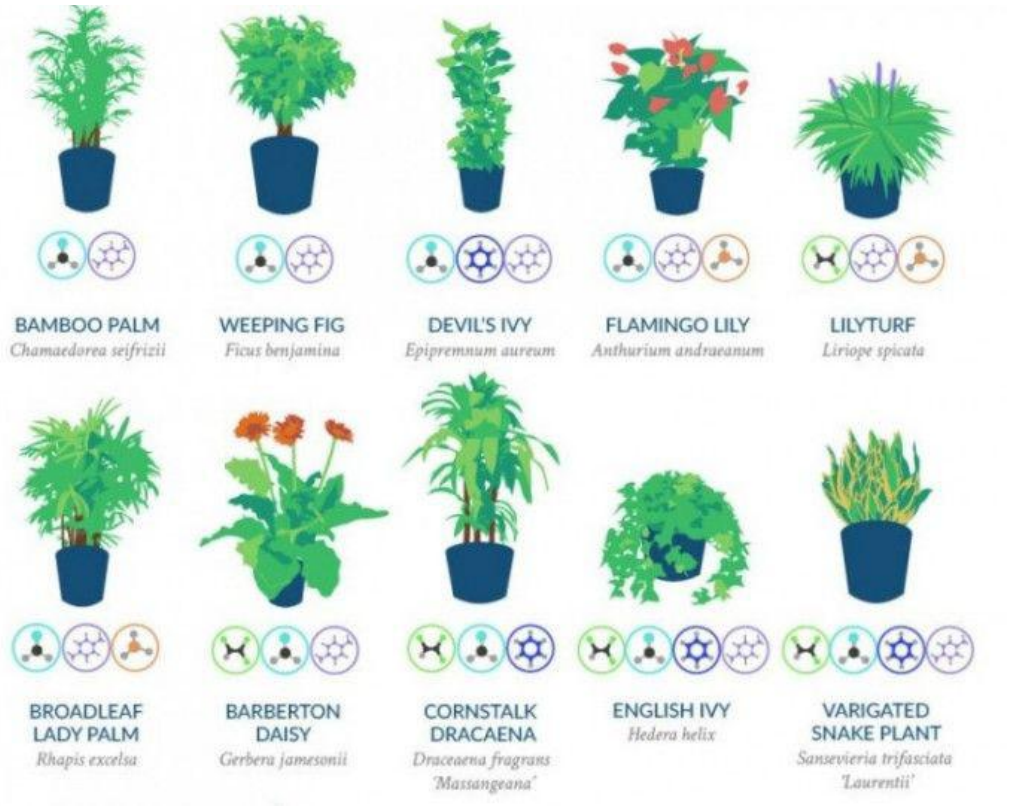
The air that we breathe contains a variety of elements needed for normal functioning, but also contains all kinds of other toxins which are produced in an urban environment. Not only CO (carbonous monoxide) pollution from traffic and aeroplanes but all of the elements used to build the building and the interior like the glue used in furniture, paint and varnishes, plastic window frames, isolation materials, etc.

The orientation of the building, and also the height at which we live can make a large difference when it comes to air pollution from traffic. In most cases, the higher the apartment or office is, the cleaner the air will be. Another relevant aspect is air moisture which is important for the immune system and respiratory health.

Having plants indoors can help with most of these issues. Plants will absorb the poisonous chemicals and clean out the air for us, and they will maintain a healthy moisture level indoors.

It is also important to consider how the interior is cleaned and to be careful when using chemical agents to clean surfaces and floors. There are many natural alternatives which will clean the interior just as well.

When it comes to noise from the outside, again having evergreen trees near the roads can help reduce it while also preventing excessive pollution from reaching our homes and offices.



Sick building syndrome (SBS) is the name for a condition where people in a building or other type of enclosed space suffer from symptoms of illness or feel unwell for no apparent reason. It's attributed to poor indoor air quality but the precise cause is unknown. Diagnosing SBS can be difficult because of the wide range of symptoms and they can often be mistaken for the common cold. The key to SBS is that symptoms improve after leaving the building in question, only to come back when the person returns to the same location. Possible symptoms of SBS are: throat irritation, breathing difficulties, runny nose, headaches, allergy-like symptoms, such as sneezing, dry, itchy skin rashes, tightness in the chest, nausea, fatigue, dizziness, difficulty concentrating, forgetfulness, and irritability... SBS affects everyone differently and the symptoms can vary from person to person.

There are a variety of possible causes for SBS: buildings with poor ventilation, heat or low humidity, high levels of dust, rooms with poor lighting, volatile organic compounds from many indoor sources (including indoor surface materials, ventilation filters, office appliances, and personal computers, chemicals from cleaning products), the presence of mold or fungus, tobacco smoke…

To find the right cause of SBS and removing them takes time and investment but there are preventive measures that can reduce risk factors for sick building syndrome:

- **taking regular breaks outside of the building**
- **usage of cleaning products with low VOC cleaning agents**
- **regularly opening windows for better ventilation of the space**
- **giving eyes a break by looking away from the computer**
- **usage of plants for improving air quality in indoor spaces.**

LEARNING OBJECTIVES

Knowledge

- To learn about chemical elements existing in the air that we breathe.
- To gain insight into the compounds used to make furniture, insulation materials, paints and varnishes etc. and to understand their influence on air quality.
- To learn about the influence nearby busy traffic can have on air quality.
- To learn about sick building syndrome.
- To gain knowledge about possible causes and effects of SBS.
- To learn about preventive measures.

Competences

- To learn to identify positive and negative aspects of an indoor space.
- To familiarise the learners with the relations which exist between the surroundings of the indoor area and the area itself.
- To understand how indoor well-being can be influenced and enhanced.
- To understand the connection between indoor air quality and SBS.
- To understand how our indoor environment and everyday activities can affect health and well-being.

Skills

- To learn how to recognize indoor materials and their composites and to estimate indoor air quality.
- To gain skills in choosing natural and safe materials for indoor design.
- To gain know-how on using plants as air filters.
- To gain know-how in preventing SBS by implementing plants in our indoor spaces.

PREPARATION/MATERIALS/TOOLS

- Data on air quality in your area.
- List of compounds found in materials used for interior building (paints, adhesives etc).
- Lists of chemical elements found indoors.
- Materials on existing research on SBS
- Materials on possible causes and preventive measures regarding SBS.
- Materials and pictures of plants used in indoor spaces and their effect on air quality
- A3 papers, glue, scissors and markers.

STEP BY STEP/HOW TO

Plants for prevention of SBS / Poster making

- *Divide the learners into 3-5 small groups.*
- *Introduce the learners to the theory of SBS and give them material on this subject.*
- *Provide them with materials on indoor plants and their characteristics.*
- *Each group has 15-20 minutes to connect the causes/effects of SBS with plants whose characteristics can help to prevent them.*
- *After they are finished, discuss their findings.*
- *Make a poster on which you will place pictures of plants connected with the SBS effect that can be prevented.*

REFLECTION QUESTIONS

- How is well-being indoors influenced by the air, acoustic and material quality of the indoor space?
- How do the surroundings in which we live influence the air quality indoors?
- How can you affect your well-being indoors?
- Why is it important to recognise the impact of the indoor environment on our health and well-being?
- How does the space where we live/study/work affect the occurrence of SBS?
- What happens if we ignore this effect?
- How can we prevent or minimize SBS by the usage of green indoor spaces?

MODULE 3.1 INDOOR ENVIRONMENT

Sustainable water management indoors

DURATION: 1 HOUR

DESCRIPTION

This lesson will approach the subject of water management in an indoor urban setting. The learners will be introduced to the reasons why it is important to sustainably manage water and wastewater in a household and about the measures which can be taken to reduce water consumption and/or recycle water within a household.

GOAL

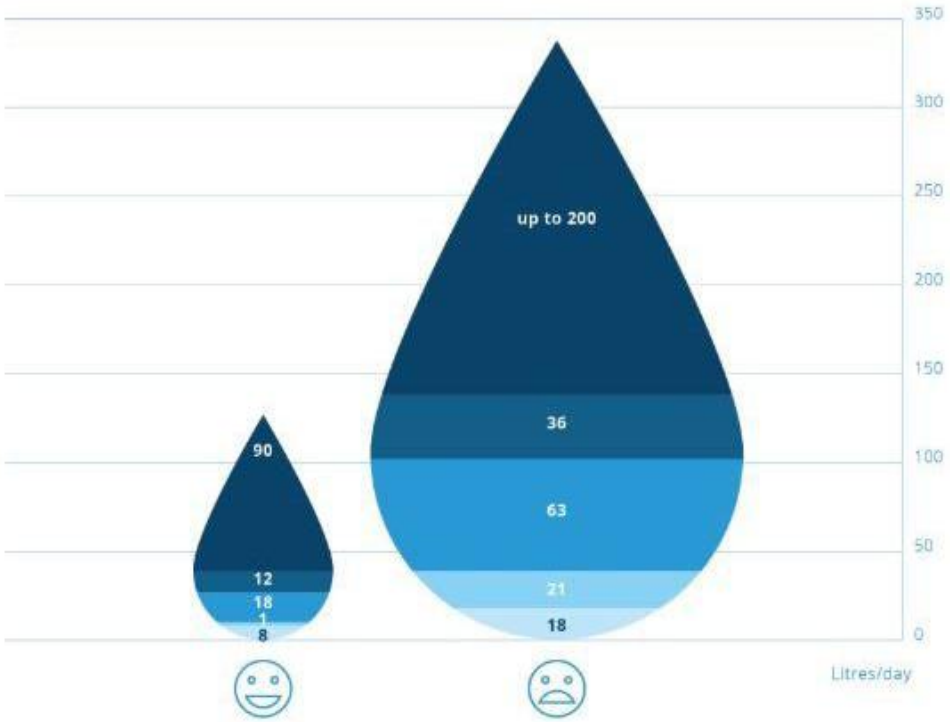
This lesson aims to introduce the learners to the importance of sustainable water management indoors and to provide them with information and motivation on how to do so.

INTRODUCTION / BACKGROUND

The water used in the urban environment comes from natural sources but first, it runs through the city infrastructure for health inspections and treatment. This water is brought to homes and public buildings to be used for cleaning, washing, flushing, cooking and in most cases for drinking as well. The wastewater created in the building is then led out to waste-water treatment facilities where it is filtered to an extent and then depleted back into the environment.

Even though rational management of the water supply is encouraged it may seem as not so simple to incorporate these approaches in a home or office. First of all, a change in consciousness is needed so that people understand that the small changes each person does, really make a difference.

The obvious actions like closing the tap while brushing the teeth or applying soap are known to everyone, but can more be done? First, it is important to understand the amount of water used for certain activities. The average household uses over 25% of water for flushing the toilet and if this is with water which is safe to drink then the problems arising from this issue are obvious.



If large infrastructure reconstruction cannot be made to implement facilities which will separate technical water for cleaning and flushing we can still have other solutions.

When it comes to washing dishes, an efficient washing machine can save time, energy and money but also it uses more resources. An extreme example of using waste water from dishes can be to collect it under the sink and then use it in the toilet or to clean floor surfaces. A more convenient way would be to plan out the pipes in the building so that this process works for itself - reusing water several times before letting it out of the household.

Compost toilet

Water from the shower or the bathroom sink can also be reused in the household. Also, we should be thinking about the hygiene and cleaning products we are using from nature into buildings and back and the processes it goes through.

LEARNING OBJECTIVES

Knowledge

- To learn about the water cycle from the source, usage to waste water and its management in an urban setting.
- To gain insight/knowledge on how much water people use and for what.

Competences

- To learn why indoor sustainable water management is important and how it influences natural processes on a wider scale.
- To familiarise the learners with the process of getting water into a building, using it and running it back into nature.
- To understand the small changes which everyone can implement to rationalise usage of water and to provide sustainable solutions for managing waste water.

Skills

- To learn how to save and recycle water within a household or office
- To gain skills in practical solutions in sustainable water management indoors

PREPARATION/MATERIALS/TOOLS

- Data and presentations of the ways and levels of water consumption in your area.
- Investigate what is your local source of water. Find out where the waste-water runs to.

STEP BY STEP/HOW TO

Water in our environment and in our homes

1. Present the learners with information you gathered about water sources, consumption and waste water management in your area.
2. Discuss and interact.

Observe / Analyse / React

1. Engage the learners to start to follow water consumption levels and means in their household. If possible let them measure the amount of water spent in a day/week/month.
2. Calculate a yearly average for each household.
3. Discuss possible ways to reduce the consumption by incorporating changes in everyday habits.

REFLECTION QUESTIONS

- Why is it important to follow our water consumption levels and react accordingly?
- How does water cycle from the source to the urban environment and back?
- What happens if excess waste-water is depleted into the environment without proper treatment.
- How can you affect the water management situation in your immediate surroundings?

MODULE 3.1 INDOOR ENVIRONMENT

Composting indoors

DURATION: 2 HOURS

DESCRIPTION

In this lesson we will learn how to compost at home (balcony / interior) and what are the benefits of indoor / home composting.

GOAL

The goal of this lesson is to understand the reasons and the importance of composting, the problems it solves and the benefits that are achieved. After this lesson, participants will gain the knowledge to compost on their own at home.

INTRODUCTION / BACKGROUND

Biowaste makes up two-thirds of the waste produced in urban conditions, and a large part of this waste is generated in households. Instead of taking this waste to common landfills where mixed with other types of waste and decomposed creates greenhouse gases harmful to the atmosphere, unpleasant odours that reduce air quality and the problem of leachate that pollutes the soil and groundwater, this waste can be separated as a raw material used in composting plants for the production of compost that has applications in agriculture and horticulture. Some of this waste can also be composted at home by following a few simple rules.

LEARNING OBJECTIVES

Knowledge

- To learn about the processes that take place during the composting process.
- To gain insight on the importance of composting.

Competences

- To learn to identify the types of biowaste that can be used in the composting process.
- To familiarise the learners with the concept of a compost toilet.

Skills

- To learn to apply "recipes" and tricks for composting at home.
- To gain skills in alternative methods of household biowaste treatment.

PREPARATION/MATERIALS/TOOLS

- Board / magnetic board, chalk / markers
- Bucket with lid
- Drill (battery) and / or power source
- Mixing spatula
- Watering and watering cans
- Thermometer
- Gloves
- Posters showing brown and green bio waste
- Poster with a schematic representation of a home composter
- Leaflet with instructions for composting
- Different types of biowaste (green and brown component)
- Bowl for bokashi / EM

NOTE: before the lesson ask students to bring green & brown compost material, give them list with of bio-waste they should collect and bring.

STEP BY STEP/HOW TO

Before the practical part of this lesson, participants are asked to recall lessons on soil construction and garden composting methods. Note that this is the same process but in different conditions and the absolute amounts of components we use in composting.

Then we do a survey among users to determine the amount of biowaste produced (one of the possibilities is to keep a diary of biowaste production and collect the weekly amount of waste that is brought to this workshop). We ask the question of what happens to this waste and where it ends up. What potential problems it creates to us personally and to the environment. Then we state that we can solve these problems by composting, and as a bonus from waste we get a quality raw material - compost.

Then, together with the participants, we analyse all the equipment and tools we need to make a composter and make a home composter - a bucket that has air vents and the possibility of draining excess liquid, the possibility of adding new biomass and a lid to close.

Then we analyse the brought types of biowaste (and waste that we brought ourselves) as well as additional useful elements for making compost (branches, leaves).

Step by step we go through stacking the layers of the composter and adding water, and we interpret each step in a way that explains the reasons for such a way of stacking and the processes that occur during composting

REFLECTION QUESTIONS

- What is biowaste and what can you do with it?
- Why is composting important in urban environments?
- What do you need for making a home composter?

MODULE 3.2 INDOOR GREEN SPACES

Benefits and uses for indoor green spaces

DURATION: 2 HOURS

DESCRIPTION

Introduce the learners to the positive effects of greenery in indoor spaces and the ways how we can bring nature indoors. Explore how and which plants affect our surroundings and well-being. Learners will explore the benefits of indoor plants by designing an indoor green space for their classroom or workspace.

GOAL

The goal of this lesson is to teach the significance of indoor green spaces, especially in urban areas where people rarely have contact with nature and outdoor green spaces are insufficient. Plants indoors are beneficial for making a place more attractive and cosy but also have a positive effect on our surroundings (air, temperature, noise...) and on our health and well-being. To learn which plants and how we can use them in interiors to receive all the benefits of them.

INTRODUCTION / BACKGROUND

The use of greenery in indoor spaces is becoming increasingly popular. Its benefits are recognized as a crucial factor in the design and creation of healthy and sustainable living spaces and communities in urban areas. Not only does it make the space more attractive, warmer and "alive", but already has a positive effect on the health and well-being of space users. It gives space personality and color and brings it closer to nature.

Plants can give character to the interior, separate the rooms from each other, hide flaws or optically enlarge the space. One of the great benefits is that the plants purify the air and thus contribute to the health and well-being of those who live, work or visit indoor spaces. They filter the air, reduce the level of carbon monoxide, reduce noise, stabilize temperature and humidity and reduce dust in the room.

Greenery in and around offices/classrooms and other working environments is good for the climate and has a positive effect on the health and general well-being of employees/learners and visitors. It aids concentration, helps reduce stress and increases productivity.
In and around nursing homes, hospitals and other clinics green spaces are good for the climate inside and outside the building. They have a positive effect on patients' state of mind and ability to recover, as well as the general well-being of patients, staff and visitors.

Greenery in residential areas purifies the air and reduces noise. Green roofs and facades increase insulation capacity, reducing both heating and cooling expenditure. Common green spaces reduce stress levels in general and positively affect social cohesion.

Plants are often used to organise and distribute space, obscuring unwanted views and creating privacy. They are often used to fill in empty spaces and to guide user movements, especially in large, public spaces such as shopping malls. One study found that customers are willing to spend up to 12% more when they are in a store filled with plants.

LEARNING OBJECTIVES

Knowledge

- To learn about the concept of green indoor spaces.
- To gain insight on the benefits of greenery in indoor spaces.

Competences

- To learn how greenery in indoor spaces can be used.
- To learn which plants to choose depending on conditions in indoor spaces.
- To understand how indoor green spaces affect our well-being.

Skills

To gain skills in re-designing indoor spaces to make them healthier to live/work/study in.

PREPARATION/MATERIALS/TOOLS

- Materials on plants that thrive in indoors and their effect on surrounding and people
- Pictures of indoor spaces with and without greenery
- A4 papers
- Pencils, crayons

STEP BY STEP/HOW TO

Indoor garden design

1. Have learners work in pairs or teams to design an indoor garden for your classroom or school building.

2. Explain that indoor plants have the same needs as outdoor plants, including light, water, nutrients, air and space to grow. Tell them to observe which conditions are in their classroom or school building and which plants would thrive in such conditions.

3. Let them pick out space for which they will design the garden. Tell them to draw a floorplan of the space and how they imagine the garden should look.

4. After they plan the garden structure, have learners research different plants that they think would grow well in their garden.

5. Provide time for learners to present their garden designs to others and discuss their design and choice of plants.

Observe

1. Take pictures of indoor spaces with and without plants and show them to the learners.
2. Ask them to choose interiors that attract them more.
3. Discuss about their impression and what are the reasons for their choice.

Analyse

1. Discuss what are the conditions in your classroom (temperature, air, humidity, noise...) that you want to improve by using plants and make space more comfortable for studying.
2. Identify what plants you can use.

React

1. Select plants that can be locally found or bought.
2. Research how they can be used and maintained as an input for the next lesson when you will create your own indoor green space.

REFLECTION QUESTIONS

- Why are green spaces important in urban areas?
- Why is it important to have more indoor green spaces in urban areas, where there is a lack of green outdoor spaces?
- Why is being surrounded by greenery important for our surroundings and well-being?
- How indoor green spaces affect us and people around us?
- How can we bring nature into our living and studying/work spaces?

MODULE 3.2 INDOOR GREEN SPACES

Different ways of creating indoor green spaces

DURATION: 6 HOURS

DESCRIPTION

This lesson will introduce the learners to ways of bringing greenery into our homes or work/studying spaces and experience all the benefits different plants have to offer.It will also offer understanding on which elements of the surrounding one should take into consideration (light, temperature, humidity...) before creating a green indoor space. Learners will be able to choose the most appropriate design and create an indoor garden for the classroom/school building/work place.

GOAL

The goal of this lesson is to teach which elements are necessary for plants to thrive indoors and how to identify conditions in a space where we want to set up plants for indoor gardens. To introduce learners with different ways of creating indoor green spaces, what are the prerequisites that are needed. To teach them easy DIY ways of creating green space in their own homes or classroom/work space.

INTRODUCTION / BACKGROUND

When using plants in the interior, it is important to think about size, proportion and functionality. Decide what the purpose of indoor green space is. Do we only wish to decorate and refresh our living/working space, filter harmful toxins from the air, improve indoor air quality, reduce the noise coming from outside, or to grow our own food. With good planning and the right choice of plants, we can achieve multiple positive effects and benefits from our indoor greenery.

Diversity is one of the elements or principles of permaculture but too many different types of plants in a space can create chaos. It is important to observe and analyse the space, and the needs of the plants to understand the beneficial relationships between them. This choice depends on the size of the space; the smaller the space, fewer varieties of plants should be used and vice versa. When choosing plant species it is important to pay attention to light, humidity and room temperature. It is also important to think about the manner and complexity of maintaining the selected plants. Indoor plants can be used in different ways: in jars, terrariums, pots, hanging planters, green walls etc. When grouping plants, consider their needs and condition preferences. Group plants that have the same humidity requests to be close to each other to create a pocket of moisture for every plant involved. Thinking about light and heat requirements is important in designing green indoor space. The layout and placement of these different elements should be taken into consideration. Placing a shade-loving and a sun-loving plant in the same area of the home will make it hard for one (or both) of the plants to survive. Think about zoning. Analyse the patterns of human movement, how people use the space, position of other devices and gadgets placed in a space.

LEARNING OBJECTIVES

Knowledge

- To learn which plants thrive indoors.
- To learn about different ways and designs of indoor green spaces.
- To gain knowledge about which elements of the surrounding to observe and analyse before choosing plants for indoor space.

Competences

- To learn how to choose plants and design of indoor green space depending on purpose and conditions.
- To learn how and which plants to place in indoor space depending on their characteristics.

Skills

To learn how to make a vertical succulent wall planter

PREPARATION/MATERIALS/TOOLS

- Material on different indoor plants and their characteristics
- Succulents
- A tape to measure
- Chicken wire
- A hammer and nails
- A pencil or Marker, glue
- 4 equal size thick sticks or old wooden frame
- Moss (Optional)
- A piece of board (plywood or something else)
- Staple gun
- Pincer or wire cutter to cut wires

STEP BY STEP/HOW TO

Before making vertical succulent wall planters procure succulents that are suitable for your classroom according to the analysis learners made during lesson 3.2.1.

Vertical succulent wall planter

1. Make a frame by joining the pieces of wood or use an old wooden frame.
2. Measure and cut the plyboard or picture frame board to cover the frame from behind. After you join it to the frame, stick a plastic bag or film over it to make the vertical succulent wall waterproof.
3. Evenly spread the soil in frame until the soil reaches the edge of the frame.
4. Before fixing the chicken wire, distribute moss over the soil (optional) and put succulents to see and adjust them according to colors, shapes and sizes. Once you have found the ideal location for your small plants, remove them again.
5. Attach the chicken wire using a staple gun on the edges of the frame.
6. Plant the succulents. You can skip this step if you are planting succulents from cuttings but if they are potted, you may need to cut chicken wire mesh to create small planting holes to transplant succulents with the help of a pincer or wire cutter.
7. Poke holes in the soil and then gently tuck the plants in and close the hole and mist the soil to moisten it.

Before hanging or putting the succulent wall planter in a vertical position, wait for a few days until the plants root and establish well.

REFLECTION QUESTIONS

- Why is it important to implement green space indoors?
- What benefits such space brings to us and our surroundings?
- How do the conditions of a space impact the sustainability of plants?
- How do plants impact each other due to their needs to thrive indoors?

MODULE 3.2 INDOOR GREEN SPACES

Managing and maintaining indoor green spaces

DURATION: 1 HOUR

DESCRIPTION

This lesson is to introduce the learners how to take care and maintain plants in indoor spaces. What are the basic needs they should take when caring for the plants to thrive.
The learners will explore the elements of proper maintenance of indoor plants.

GOAL

In previous lessons, learners learned how different plants require different temperatures, hydration, humidity and other conditions to thrive. The goal of this lesson is to teach the learners how to plan and apply the best way to maintain indoor green spaces according to the characteristics and needs of the plants and the conditions in indoor surroundings.

INTRODUCTION / BACKGROUND

Plant growth is affected by light, temperature, humidity, water, nutrition, and soil type/quality. When procuring for indoor plants it is important to select plants according to how much light is present in a given location. The plant's label will usually contain information on the light requirements of the plant. Most indoor spaces are heated and cooled with human comfort in mind and temperatures may vary. Temperature variations should be considered when placing the plants. Humidity may determine whether or not certain plants that are native to moist tropical regions will do well in the average indoor location. Improper watering is the cause of most indoor plant's problems. Both under- and over-watering can cause the plants to wither. Plant soil should be checked regularly to see if they need water. Adequate choice and soil preparation should also be considered. Water drainage is essential for the plants to grow. So ensure there is good drainage. Plants growing in containers have a limited volume of soil from which they have to extract mineral nutrients, so nutrients should be replenished regularly. Depending on the plant, potting and repotting will be required.

Each plant has its own set of desired environmental conditions. There are many sources of information for specific cultural requirements. The most important thing is to find all the necessary information before choosing plants for indoor space.

LEARNING OBJECTIVES

Knowledge

- To learn about the importance of proper maintenance of indoor green spaces.
- To learn how to choose the right plants depending on the space where they will be placed

Competences

- To learn why indoor plants need different care than outdoor plants.
- To understand how the indoor environment affects plant growth

Skills

To gain know-how in maintaining indoor green spaces.

PREPARATION/MATERIALS/TOOLS

- Materials on required conditions for indoor plants
- Materials on required conditions for succulents planted in previous lesson
- A4 paper, pencils, markers

STEP BY STEP/HOW TO

Plan of maintaining vertical succulent wall planter

1. Divide learners in groups of 3-5

2. Each group will be required to explore environmental conditions for a particular type of succulent you planted during the previous lesson.

3. After they found all needed information they will prepare reference guide with plant name, how often does it require watering (& fertilizer) depending on time in a year, requirements for light, temperature and humidity

4. At the end make a plan who and when will take care of necessary requirements for the wall planter

REFLECTION QUESTIONS

- Why is observation of conditions in indoor space important for adequate choice and maintaining of plants?
- How do particular types of plants react to surrounding conditions?
- How can we facilitate maintenance with the right combination of plants?

MODULE 3.3 INDOOR PLANTS AND FARMING

Considering the right plant for the right location and the environmental needs of different types of indoor plants

DURATION: 3 HOURS

DESCRIPTION

In this lesson, participants will be introduced to plants that can be used for growing indoors. They will get acquainted with houseplants that can be used for different purposes: the purpose of cultivation for food, decoration and various other purposes and functions that plants may have like impact on air quality, pleasant smell, prevention of negative effects of electromagnetic waves, etc.

Participants will also get acquainted with plants that are not local but are most often used indoors and get acquainted with their characteristics, needs and learn how to place plants in space to achieve the desired positive effects.

GOAL

The goal of this lesson is to learn to distinguish between houseplants and the different needs that individual plant species have, but also their functions in space. Get acquainted with the conditions needed to be met to successfully plant and maintain plants indoors

INTRODUCTION / BACKGROUND

Planting houseplants is widespread and there is almost no indoor space where some of the houseplants cannot be found. However, when planting, several common and easily available plants are most often used, which are ones offered in plant shops and flower shops. The basic criteria for selection are the aesthetic component and ease of maintenance of the selected plant. However, in addition to the above benefits and characteristics, plants have many other beneficial effects on humans, and smart positioning in space can achieve their full potential.

Numerous studies have documented and confirmed the various positive properties of plants on humans and their impact on the environment. We can also use this knowledge when designing indoor spaces.

Permaculture analysis and design principles are also applicable to indoor spaces and, taking into account the above benefits that plants offer, will be successfully used in the selection and position of houseplants

LEARNING OBJECTIVES

Knowledge

- To learn about different types of houseplants
- To gain insight / knowledge how and where to get a houseplant

Competences

- To learn why it is important to choose and place a houseplant correctly
- To familiarise the learners with the permaculture way of thinking when choosing the type of plant and its place in space
- To understand the different functions that houseplants can have

Skills

To learn how to take care of houseplants

PREPARATION/MATERIALS/TOOLS

- Board / magnetic board, chalk / markers
- Paper, pencils and crayons
- Houseplant manuals
- Infographic on benefits of houseplants
- An example of a floor plan of an interior space

STEP BY STEP/HOW TO

Part One - Plant Awareness (25 minutes)

In the introductory part, we examine the participants about their experiences with houseplants. We ask them about houseplants in their homes and in other areas where they spend their time.

What species they know, where they are placed, the reasons why they chose or noticed them and what experiences they have with them.

We write the information on the board.

Next to each written plant, we list all the information we know about it.
In this section, we want to gather information about used plants and raise awareness of the functions they satisfy their owners. In addition to the functions that are listed and which the participants are aware of - we add other functions that the plant has.

Part Two - Awareness of Our Needs (25 minutes)

In this part, we analyse the needs that students want to meet in the space in which they live or spend their time. We write them on a board on the opposite side of the listed plants.

The goal is to collect sensations that feel both comfortable and uncomfortable. Risks known to exist indoors, electromagnetic radiation, air pollution, noise are also listed.

We also examine users' available time for plant care and self-assessment of the level of knowledge for plant maintenance.

Part Three - Synthesis (25 minutes)

We connect the existing information on the board - the useful function of the plant with the need of the user and the location in the space where the need arose.
We continue with the PowerPoint presentation in which we present different types of plants with clearly indicated functions, spatial and other requirements for plant maintenance, and end with a table - infographics that will be a tool for the upcoming exercise.

EXERCISE Right plant for right place

1. We take the example of the floor plan of a space
2. We define the users of the space and the manner, purpose and time of using the space.
3. We analyse their resources.
4. We analyse space and all potential impacts on users.
5. Using the attached infographics and previous experience, we place houseplants in the space considering their positive functions and respecting the characteristics of the space and the capabilities of users

REFLECTION QUESTIONS

- Why is it important to know more about houseplants?
- How does permaculture help you to design your indoor space?
- How can you affect a more pleasant and functional living and working place?

MODULE 3.3 INDOOR PLANTS AND FARMING

Tools and practices in indoor urban farming, micro vegetables and sprouts

DURATION: 2 HOURS

DESCRIPTION

This lesson will transcend the idea of farming in an urban environment to an urban indoor setting. As expected, some adaptations would have to be made to the approaches already covered in other lessons. Through this lesson the idea of growing food in enclosed urban spaces will be covered - this will not include greenhouses.

GOAL

The goal of this lesson is to familiarise the learners with the possibilities to grow food indoors. The learners will be introduced to the basic principles of starting an indoor garden.

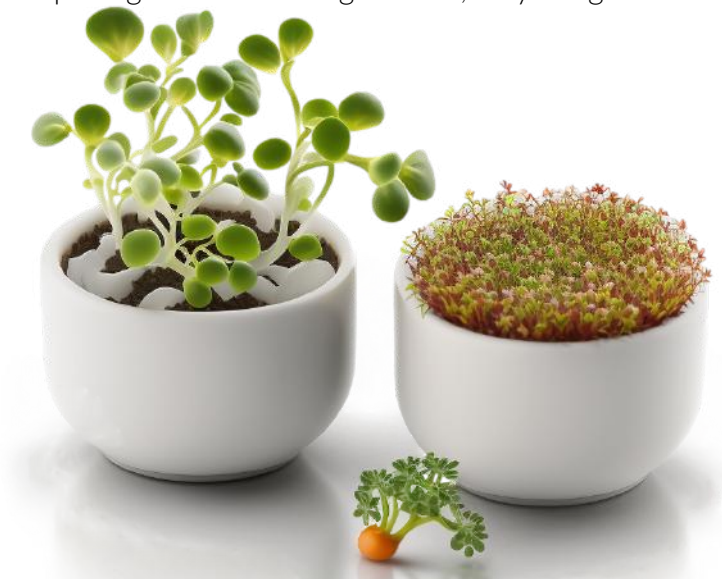
INTRODUCTION / BACKGROUND

Growing vegetables indoors is becoming a more usual practice in modern times as people are starting to understand how beneficial it is to grow food at the source of its consumption. Depending on the growers' wishes, spatial possibilities and microclimate, it is possible to grow a variety of foods indoors. When growing plants indoors the most important thing for them is to have a good source of daylight. Obviously it is best to grow most plants near a window.

If the indoor area is big enough, one can decide to plant and wait for the plants to gain their full size. However, in households it is more common to grow types of vegetables which sprout quickly or types which can be picked in frequent intervals for regular consumption like salads.

The best type of plants to grow indoors are sprouts and micro vegetables. They can be grown in small containers and will just ask for a daily dose of air and moisture. Sprouts can be grown from a variety of vegetables like beans, leek, swiss-chard etc.

Apart from sprouts or micro-vegetables, perennial aromatic plants like basil, parsley, coriander, etc. can be grown in a kitchen to always provide fresh spices for cooking. These can be grown in small pots and with good care by spraying with water, changing the substrate and increasing the pots as the plant grows and adding manure, they can grow healthy and be strong for years.



LEARNING OBJECTIVES

Knowledge

- To learn about possible methods of growing food indoors and which plants are best to grow indoors.
- To gain insight/knowledge on how to care for indoor plants and what the benefits of having them are.

Competences

- To learn why indoor farming is beneficial according to the 3 permaculture ethics.
- To familiarise the learners with the beneficial economical side of farming indoors and the possibilities to create new businesses.

Skills

- To learn how to farm indoors: choose the right plants, the right spot and how to care for them
- To gain skills in growing their own food.
- To gain know-how in starting an indoor garden and caring for it.

PREPARATION/MATERIALS/TOOLS

- Plastic or Styrofoam containers (recycled)
- Planting substrate (potting soil, soil for flowers or veggies)
- Pieces of glass the size of the container (or stretch foil or a piece of plexiglass)
- Seeds (leek, broccoli, swiss-chard, beans, peas, mustard, lettuce, kres-salad)
- Spray-bottle for water

STEP BY STEP/HOW TO

Grow your own micro-garden

1. Choose an indoor area with plenty of light and place the container on a raised position. Be sure to protect the surface underneath from water running from the container
2. Fill the container with soil and spray it with water lightly.
3. Choose the seeds you will propagate in the container and distribute them evenly - press them down just so that they are covered in soil.
4. Spray again with water lightly.
5. Cover the container with glass/plastic/stretch foil.
6. Once every day open the container for 20 minutes to allow air inside and to check if the soil is moist; if it's not moist, spray with water.
7. Depending on the variety of plant, they will start sprouting within days.
8. Follow the development of the sprouts and when it's time to pick them, try eating them raw together with the learners.
9. Motivate the learners to do research on the nutritional benefits of eating sprouts.
10. If you wish, continue to grow the sprouts (or micro-veggies) in the classroom.
11. This exercise can also be assigned to the learners as homework

REFLECTION QUESTIONS

- Why is indoor farming practical and important?
- How does growing food indoors influence the food consumption chain?
- How can indoor farming influence the health of the ecosystem and of people?

MODULE

4

URBAN WILDLIFE

8 lessons – **23** hours

Urban wildlife - What is?

DURATION: 2 HOURS

DESCRIPTION

This lesson will introduce the presence of wildlife in the urban environment, where these wild animals come from, why they are present there, and how these urban areas might affect them.

GOAL

The goal of this lesson is to draw learners' attention to the fact that urban areas, such as cities and suburbs, in addition to other primary human habitats, are also habitats of numerous animal species.

INTRODUCTION / BACKGROUND

Various species of animals live in the cities (or occasionally come to them), from the smallest ones (insects, spiders, ringworms) to various species of birds, rodents, insectivores, all the way to the large ruminants and predators. Any animal species that lives and reproduces autonomously in urban conditions, without man directly and consciously providing for them with food and water can be considered wild urban animals.

Native wild animals: They come to the city from neighbouring, wild areas and adapted to the living conditions of the city: insects, rodents (rats, mice, squirrels), small carnivores (weasel, marten, ferret, fox, badger), birds (sparrow, pigeon, turtle dove, crow, seagull, birds of prey, (nocturnal and diurnal), reptiles (snakes and lizards), and even larger predators can become part of the city's fauna (leopard in Mumbai).

Invasive wildlife: Their original habitat is not the city or the area around the city. The introduction of alien species into the city (and the area around it) occurred either by accident, escape or deliberate abandonment of exotic pets (goldfish, iguana, python), or escape of animals from commercial fur farms (nutria, mink, raccoon dog). There is also the intentional introduction of alien species into local ecosystems. For example, mongooses on Croatian islands, sparrows and starlings in the USA. Similar climatic conditions and lack of natural population regulation (predators, species-specific diseases) often lead to imbalances of indigenous ecosystems.

Feral domestic animals, whether through escape or abandonment, can also create a stable population in urban conditions (runaway tame pigeons, domestic cats, stray dogs, pigs, and even cattle).

Wild animals that come to urban areas occasionally or seasonally. Whether due to seasonal migrations, or in search of food, or due to habitat destruction caused by natural disasters or human activities (bear, cougar, jackal, moose, deer, wild boar). Although they are not present in urban ecosystems all year round, their presence, if any, must not be ignored.
Learning ob

LEARNING OBJECTIVES

Knowledge

- To learn to understand and recognize local urban wildlife.
- To gain knowledge of identifying their habitats.
- To learn about the needs of animals in an urban environment.
- To develop the ability to define their behaviour (solitary or social, timid or aggressive).
- To be able to define their impact on the ecosystem (who they eat, who eats them, the impact on urban flora, the impact on the human community).
- To be able define their impact on people (quality of life, hygiene, health, impact on property).

Competences

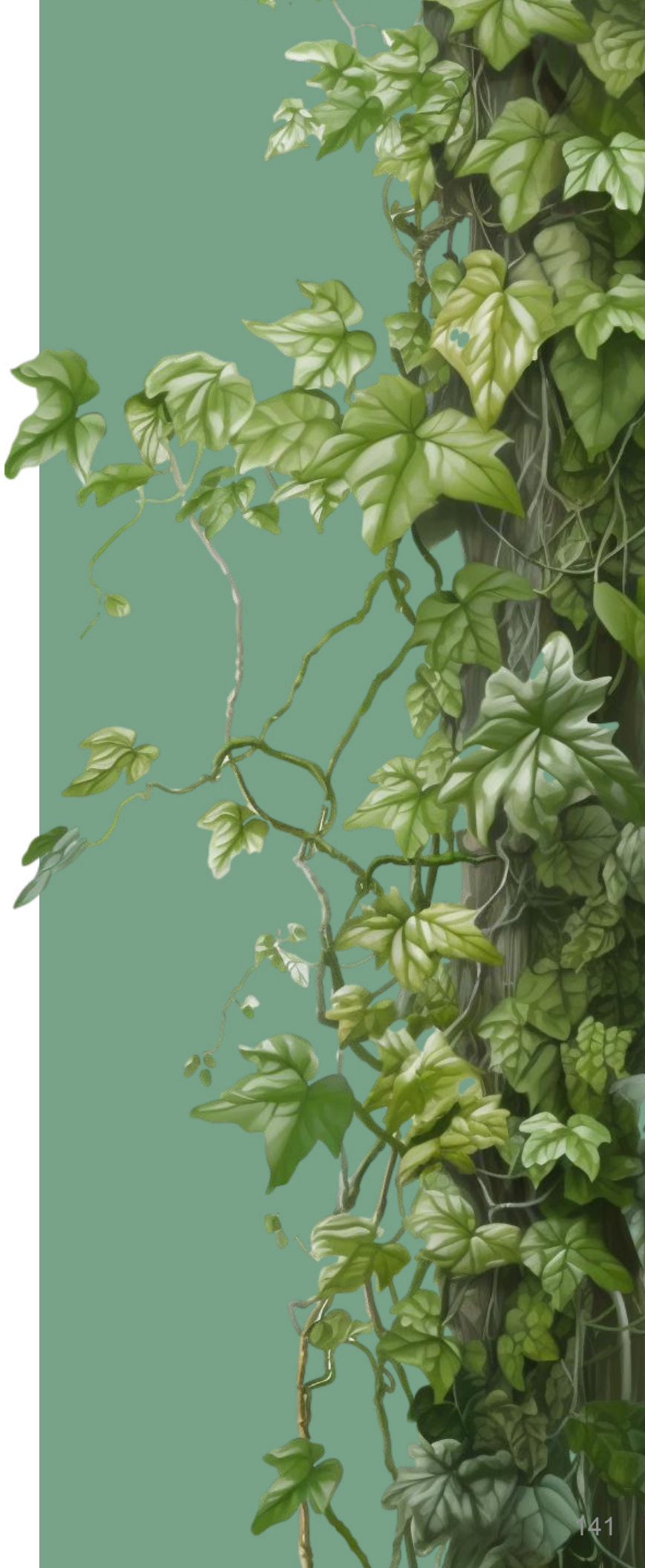
- To familiarise the learners to wildlife inhabitants of cities, with the number of species and the number of individuals within the species.
- To understand that urban areas, regardless of their primary purpose to enable and facilitate the life of a large number of people in a relatively small area, are also a suitable habitat for numerous wild animal species.

Skills

- To learn how to recognize animal species in urban areas, assess the impact on other animal species, the entire ecosystem and the quality of our life in it.
- To gain skills in understanding the similarities and differences between their natural habitats and urban habitats.
- To gain know-how of why certain animal species inhabit the city.

PREPARATION/MATERIALS/TOOLS

- A flipchart and markers



STEP BY STEP/HOW TO

1. The title on the board is "Urban Wildlife". Divide the board into four columns, and name each column as follows:
   - Native wild animals
   - Invasive wild animals
   - Feral domestic animals
   - Wild animals that occasionally come to town

2. Ten minutes of brainstorming, where learners list all animal species (except insects, spiders, scorpions, ringworms): mammals, reptiles, amphibians, birds, fish that they are sure have been seen in the city area. Together with the leader, define in which of the offered columns to classify them. Personal opinions, and the opinions of reliable witnesses, newspaper news and the like can be considered.

3. After the expiration of time:
- count the listed species
- count them by groups (mammals, reptiles, amphibians, birds)

You have noticed that arthropods are not listed in the exercise. If we had listed them, the number of species would be many times higher and the network of mutual influences would be much more complex. Insects (lat. Insecta) are the most numerous class of the large group of arthropods (from Ancient Greek arthron - 'joint', and pous - 'foot'), and these species are more numerous than all other animal groups combined.

Observe / Analyse / React

The aim of the exercise is:

1. To visualise how many different animal species share living space with us
2. Which groups are the most numerous
3. How complex our specific urban ecosystem is

REFLECTION QUESTIONS

- Why are urban wildlife populations denser in their urban areas than in their natural habitats?
- Which animal species have a positive impact on the quality of life of people in cities?
- Which animal species have a negative impact on the quality of life of people in cities?
- Which animal species have no impact?
- How can we influence the growth or decline of an animal population in a city?

MODULE 4.1 URBAN BIODIVERSITY

The importance of Urban biodiversity

DURATION: 2 HOURS

DESCRIPTION

This lesson is to introduce the students to what biodiversity is and how important it is to protect and improve our biodiversity. How we humans have affected it and how to undo the changes. Explore what plants, animals and insects exist in your local urban environment and to know what is missing. Take the class to urban walks, learn about what lives in your local nature and urban environment and plant native fauna to attract bees, butterflies, birds and other species.

GOAL

The goal of this lesson is to teach the importance of a high biodiversity in the urban environment, what it is and how it works. To learn that the biodiversity is getting smaller and is at risk to completely disappear. To get tools and knowledge of how to protect and increase biodiversity with practical and simple methods.

INTRODUCTION / BACKGROUND

Our effect on biodiversity:

- 55% of the world's population now live in cities.
- Animal populations worldwide have declined nearly 70% the last 50 years.
- Between 10,000 and 100,000 species are becoming extinct each year.

"There can be little debate that there is, in fact, a very serious biodiversity crisis." - WWF

Now with more than half the human population living in huge urban environments, room for nature and its biodiversity is getting smaller and smaller. Animal populations are plummeting and more and more species are becoming extinct. It is time we start to coexist with nature and not be detached. We need to prioritise attracting nature back into our urban worlds, which will benefit us all tremendously.

Biodiversity is the network of species that are coexisting in a chosen area. Urban biodiversity is the plants, insects and animals that live in an area highly populated by humans, like a city or town. Usually the biodiversity is much lower in these areas because we humans have removed most or all the nature that existed before. The lack of shelter, food and water is limiting what can survive in our environment and it is our responsibility to regenerate the urban habitats. By introducing green areas with local fauna, shelter and water, we are able to slowly improve biodiversity.

LEARNING OBJECTIVES

Knowledge

To learn what biodiversity is and how it works.

Competences

To understand why biodiversity is beneficial to us.

Skills

To learn how to identify local biodiversity and the possible lack of it.

PREPARATION/MATERIALS/TOOLS

- Books on local fauna, insects and/or animals.
- A big bundle of wool or string.

STEP BY STEP/HOW TO

The web of connected biodiversity

1. Each student is given a piece of paper. They each have to draw or write an animal/insect/plant. (time?)

2. The students then have to stand in a circle while holding the paper in front of them, for all to see.

3. A bundle of string is given to one random student. This student has to hold the end of the string and give the bundle to a new student. The choice has to be made in relation to the two papers they hold and the student has to explain their reasoning when giving the bundle.

4. The next person gives the bundle to a new student while holding on to the string, the same way as the first did. For example a student with a bird giving the bundle to a student with an apple, continuing to a student with a bee.

5. The game ends when all students hold the string at least one time. The goal is to have the bundle create a big network between all the students.

6. BONUS: At the end, choose one student to drop the string and step away from the circle. This should result in some kind of collapse of the network, showing how loss of species can affect biodiversity.

Observe your biodiversity

1. Every student needs a pen and paper.

2. Take a walk around the local urban environment.

3. Every student has to describe / draw / take pictures of the animals, insects and plants they encounter.

4. Discuss and share the classes finding and try to identify what was found. This can be done with books, internet or/and apps.

Identify the missing biodiversity

1. Research with the class what fauna, insects and animals exist in your area.

2. Identify what species are missing by comparing results from the previous exercise.

REFLECTION QUESTIONS

- Why is biodiversity decreasing in our urban environment?
- Why is it important to have a high biodiversity?
- What happens with a low or non-existing biodiversity?
- What happens if a species is removed from biodiversity?
- What happens if a species is introduced to biodiversity?
- How can you affect the biodiversity where you live?
- How does biodiversity affect the lives of people in the city?

MODULE 4.1 URBAN BIODIVERSITY

Food chains and interdependence of species

DURATION: 3 HOURS

DESCRIPTION

This lesson discusses food chains and the relationships among the living beings within urban ecosystems with an emphasis on food sources. A solid and diverse food chain is one of the cornerstones of the health of all ecosystems.

GOAL

The goal of this lesson is to explain the food chain, and the differences and specifics between food chains in the wild and those in urban ecosystems, as well as the interdependence of species.

INTRODUCTION / BACKGROUND

Most food chains in natural terrestrial ecosystems usually start in the soil. Through photosynthesis, plants sequester carbon and nitrogen from the air, consuming some portions for their growth and pumping some in the form of simple sugars into the soil, thus feeding the symbiotic microorganisms present in the soil.

Microorganisms, symbiotic bacteria and mycorrhizal fungi thrive on the food obtained and in return supply the plant with micronutrients necessary for growth that the plant could otherwise not extract from the mother soil. However, these microorganisms have their own predators such as amoebas, flagellates, other bacteria, nematodes, protozoa and earthworms, that prosper on a stable prey population. Even they, this first predatory step, have their own predators in larger microorganisms such as insect larvae, arthropods, shrews and moles.

The 'prey and predator relationship' is not the only nutritional relationship among the soil ecosystem organisms. Saprophytes and carnivores, which feed exclusively on dead organisms, are also an integral part of the food chain - fungi, bacteria and higher order animals. We must not forget the parasitic organisms either. In order to grow and reproduce, they need a living host. In this group too we have microscopic organisms such as bacteria, amoebae, fungi, as well as insects that inhabit in or on a living organism, and live and grow by feeding at the expense of the host.

Plants are not excluded from food chains either. Other organisms eat them, parasitize them, and create symbiotic relationships with them. Plants do the same as animals. They parasitize on other plants (fairy hair, mistletoe), hunt and eat animals (carnivorous plants), enter into complex symbiotic relationships with fungi (mycorrhizae), insects and other plants.

The living world has very complex and intertwined food chains, which form a complex food network. A carbon or calcium atom will make a long journey through different individuals of different organisms before it evaporates into the air or mineralizes and becomes a part of the soil.

Food chains in urban ecosystems rely only in part on food produced on site. Residents of urban areas cannot meet their food needs with their own production, at least not entirely. Cities, however, were created to be inhabited by a large number of people. There is simply no place or conditions for serious food production. Much of the food in cities comes from remote areas, even from other parts of the world. Urban areas are large consumers of food grown elsewhere. And thanks to the possibility of importing food, it is possible for a large number of people to live in a relatively small space. Sometimes several thousand inhabitants live in one square kilometre of urban space.

The wildlife of urban ecosystems follows the same pattern. Many wild animals in urban areas depend on imported food. Rodents thrive in the city's sewers, in large warehouses and food stores, and feed on discarded food from households and restaurants. City pigeons occupy parks and squares feeding on what they find on the streets. They are also often fed by people. Most wildlife populations that inhabit urban areas have a denser population than the one they could attain in their natural environment.

The food chains of urban ecosystems can be roughly divided into:

- Food chains that start on local soil, in city parks and other green areas. This formation of the food network is the same as in nature. Wildlife populations directly depend on the amount of food available. A simplified view would be:

soil → plants → herbivores → omnivores → carnivores

Of course, microorganisms are an integral part of any link in the chain.

The most numerous animal species in this food chain are the local native species, which usually live in the nature around the city. Insects, birds and mammals. We most often meet them in parks that provide them with everything they need for life.

- Food chains that rely on food brought to the city by humans. The soil that supports these food chains is miles away. "Surplus" food for humans is food for wild urban animals., whether the food was "stolen" due to poor storage, or whether it was food that was thrown away for various reasons. A simplified view would look like this:

"Surplus" food intended for humans → herbivores → omnivores → carnivores

This chain is also intertwined with microorganisms in all its segments.

The most common type of rodent that thrives primarily on food intended for humans is the brown rat (Rattus norvegicus). It is originally from Asia, and it expanded its population worldwide by the eighteenth century. This intelligent and adaptable rodent is a resident of most cities in the world. It is omnivorous, reproduces rapidly and its habitats are diverse, from city sewers to warehouses, basements, tunnels, parks.

Many other species such as mice, cats, pigeons and crows, like to eat food from human "surpluses" too.

These simplified representations of food chains in reality are more like a densely woven web. Most animals will use all readily available food sources, regardless of their origin. Animals that we would maybe place in the first food chain we will often see entering garbage containers in search of food, just as rats and mice can often be seen on the city's green spaces.

The interdependence of species is most evident in the following illustrations of food chains.

- The population and diversity of predatory species depends on the number of species, prey population and its density. This link is reciprocal. Predators depend on prey as a food source, and to prey populations they act as regulators of their numbers, guardians of the health of the population. Their first choice are individuals that are old, sick, or for any other reason easier prey than healthy individuals in their prime.

Interactions between different forms of life and their interdependencies are manifested in many different ways.

Here are just a few examples of the interdependence between flora and fauna:

- Plants depend on pollinators (bees, flies, wasps, birds)
- Many plant species (oak, beech, laurel, olive, burdock) use animals to spread their mature seeds; birds and mammals hide seeds as a food supply, which then germinate if let uneaten into new plants, or they eat it and poop it in a new location, or it is simply carried attached or glued to their fur or feathers)
- Carnivores feed on herbivores, and thus keep the herbivorous population at a sustainable number. A healthy population of songbirds, insectivores, lizards, centipedes, scorpions are a guarantee of the health of the city's greenery.

Many animal species have evolved to become interdependent on other species in many more ways than mere hunter-prey relationship:

- Some animals (owls, squirrels) nest in abandoned holes in tree trunks made by woodpeckers
- The population of cuckoos depends on healthy populations of other birds (it does not build a nest, but lays eggs in other birds' nests)
- Abandoned dens of one species are often used by another (foxes use badgers' dens)
- Parasitic species directly depend on the host. Also, some parasites in their developmental path, from egg to mature individual, pass through multiple hosts of several different species.
- Parasitic species act as a regulator of pest numbers (parasitic wasps that lay eggs in the bodies of insect pests)
- Carnivores (birds, mammals, insects), as cleaners, quickly find and eat carrion or the remains of predator's prey, preventing the development and spread of disease (salmonella, botulism…).

No animal species in a stable ecosystem is a world unto itself. Each animal (and plant) species in the system has many functions, and directly or indirectly affects many other species. Local species have evolved together and created a network of interactions and dependencies. They regulate each other's numbers by feeding on each other, protecting each other, providing each other with living space, a place to reproduce, eventually directing each other's evolutionary paths.

Species that do not belong to local ecosystems, precisely because they did not have a common evolutionary path with local species, are a potential threat to all. If their living conditions are favourable, and there is a lack of predators, parasites and diseases that regulate their numbers in native habitats, it can lead to disturbance of the delicate balance of the ecosystem.

LEARNING OBJECTIVES

Knowledge

- To learn about local urban animal species and their eating habits.
- To gain knowledge of the complexity of the urban ecosystem and the interactions and interdependence between plants and animals.

Competences

- To understand the reasons why urban wildlife exists at all.
- To familiarise the learners with local wild species, their needs for food and living space, their place in food chains and their broader position in the urban ecosystem.
- To understand the complexity of ecosystems and the interactions of flora and fauna.
- To understand the fragility and delicate balance of any ecosystem, including the urban one.

Skills

- To learn how to estimate the number of animal species and the size of their population by observing the impact on the environment and the rest of the ecosystem
- To gain skills in assessing which species are lacking in the urban ecosystem or whose populations are too small.
- To acquire knowledge and skills on how to directly and indirectly affect the size of a population of a species.

PREPARATION/MATERIALS/TOOLS

- Blackboard and chalk / flipchart and markers
- List of animals from the lesson "What is Urban wildlife"

STEP BY STEP/HOW TO

Interactions among living beings in the urban ecosystem

1. Add plants to the list (generic names, trees, shrubs, grasses)
2. Add arthropods (insects, centipedes), mollusks (snails)
3. Use a colored marker to draw a line between the species that have:

    - predator / prey relation
    - share the same habitat (eg squirrel and crow, link tree)
    - reproductive link (eg cuckoo and blackbird, bee and cryptoceeds)
    - protect food from pests (eg birds and lizards eat insect pests, indirectly protecting plants)
    - parasitize on each other (eg mosquito, tick, pinworms)
    - another connection between species, direct or indirect

Use different colours for different types of connection. Approx. time – 10 minutes

learners end up with a dense multicolour network of interdependencies, an illustration of the complexity of the urban ecosystem.

EXERCISE

- Pick one species and eliminate it from the (eco) system.
- Count the species that will be directly and indirectly affected by the absence of the selected animal species.
- Do the same with other species.
- Try to determine which species would fill the emptied space
- Try to determine how many species you can eliminate to significant damage the ecosystem.
- Try to identify key species in the urban ecosystem (whose disappearance would cause significant disruption or collapse of the ecosystem)

- Open discussion

REFLECTION QUESTIONS

- How can breaking food chains affect the population of prey or predators?
- Why is a complex ecosystem, with many different life forms, more resilient than simple ones, with only a few species?

MODULE 4.1 URBAN BIODIVERSITY

Impact of human behaviour on biodiversity and measures to foster biodiversity in urban environments

DURATION: 6 HOURS

DESCRIPTION

This lesson discusses the negative impacts of human behaviour on biodiversity, and suggests several ways to change that.

GOAL

The goal of this lesson is to point out ways to increase biodiversity in the city environment

Praying Mantis

INTRODUCTION / BACKGROUND

Education

Unfortunately, many city dwellers are unaware of how important a rich urban ecosystem is and how directly and indirectly the diversity of the system affects their quality of life. Alone, without the support and understanding of the community, we will not achieve much. In order to increase the diversity of urban wildlife, it is crucial to educate and involve as many fellow citizens and institutions as possible. We can do this in many ways.

Hotel for insects

- By acting through various associations, environmental, animal protection, habitat protection: Promoting and supporting initiatives to save certain species or preserve habitats.

- By organising public lectures, forums and workshops.

- Cooperation with city institutions, utilities, schools, kindergartens and local communities.

- Informal education of people with whom we are closely connected (family, colleagues, friends) briefly explain why and how. Imposing a topic that people are not interested in can be counterproductive.

- Be a good example, physically do as much as you can. One hotel for insects in our garden is a big plus for wildlife, and if we manage to interest the neighbours, the effect is even larger.

City planning; wildlife habitat construction and maintenance

The centres (cores) of old towns were often built without enough or even no green space. In these parts of the city, wildlife is limited to animals that can find habitat within buildings. Rodents find habitat in and under houses and buildings, while pigeons and sparrows nest under eaves and in attics.

- Such cores and old towns are often protected as historical heritage, and the removal of buildings for planting greenery is not an option.
- Parks and tree lines can be replaced to some extent by planting individual trees, if space allows. Also, we should not forget the bushes, and flower beds.
- Pots on balconies, vertical and roof gardens are also desirable.
- Birdhouses, bird feeders and watering places for birds and bugs that fit in style can also attract new bird species.
- Homes for bats.
- Enable birds access to the attics. In addition to pigeons, attics are a favorite nesting place for owls and scops owls. Also, bats like to use them.

New parts of the city are usually planned with many more green areas, parks and tree-lined avenues. Neighbourhoods with residential and commercial buildings and skyscrapers generally have flat roofs that do not provide very safe nesting shelter.

Buildings, residential and business districts

- Construction of roof gardens, flower beds and vegetable gardens, vertical gardens, climbing plants.
- Bird houses, bird feeders and watering places for birds and bats on the roofs of buildings, incorporated into the roof greenery.
- Homes for bats.
- Introduction of local animal species in roof gardens that would not be able to reach them on their own (lizards, frogs, toads). Of course, provide them with habitat, shelter and enough food. Introduce a sufficient number of individuals that can establish a stable population in the roof garden. Be sure to consult with experts before such an intervention
- Provide a suitable nesting place for birds of prey. Often mountain gorges are replaced by city skyscrapers, and once established a nest site will not leave for years, as long as they have enough privacy while raising young. Investigate which birds of prey live in the wider area of the city, what places they use for nesting, and which is their favourite prey. We should try to imitate natural conditions.
- Place a beehive in the roof garden. In addition to increasing biodiversity, we will also increase the yields of our (and neighbouring) roof crops and have our own honey and wax.

Suburbs of family houses with gardens

- Depending on the size of the property, it is possible to plant flower beds, vegetable gardens, orchards, ornamental trees, shrubs. Such private gardens, with good planning and maintenance can be real oases of local wildlife.

- Fences around the property (if any) should be passable for small animals (hedgehogs, toads, etc.).

- Set up hives, birdhouses, bird feeders, and provide water.

- Provide nesting sites for birds (dense canopy, shrubs).

- Hotel for insects, will provide a wintering place and breeding ground for solitary bees, ladybugs and other insect

- Do not grow monocultural lawns. It is much better to leave the part intended for the lawn to the local vegetation or to sow it with a planned mix of wild and cultivated species of flowers and grasses. Do not mow it too often, let the plants bloom and develop seeds. This "lawn", except as an oasis of mini wilderness in the city, will attract pollinators, insects and small animals, provide them with habitat, and be a source of food. And it will require a lot less maintenance.

Parks and green public areas are home to many species, tree canopies are an ideal place for birds to live and nest, mammals, habitat and food source for insects and other arthropods. In their foothills, in fallen leaves and ground vegetation, life also flourishes. Mammals and birds feed on fallen fruit, looking for insects and earthworms.
The soil of the parks is also full of life, microorganisms and various species of fungi thrive in symbiosis with the trees, or decompose the dead fallen matter. Not all parks are planned and maintained in the same way, and not all support biodiversity equally well.

The planning of the new park is limited by the given area, new ones are planted on empty plots, from scratch, some will be able to fit existing trees and shrubs. A good design of the future park can provide good conditions for future settlement of wildlife.

- Plant species adapted to the climate in the park, autochthonous species of trees and shrubs are best adapted to the climate and local soil microorganisms. Also, local plant species will attract local animal species faster. They experience it as their habitat, an extension of the wilderness. Also non-native species are a good choice. Especially if they are already present in the wider environment, and are not invasive. They are already well adapted to local ecosystems. For species that are from a similar climate, but are not already present in the area, special caution and consultation with the profession is required. It is possible that we will introduce an invasive species into the park, which over time can become a problem, not only in the ecosystem of the park and the city, but also in other surrounding ecosystems.

- When designing the park, consider local wildlife as potential users, explore their needs (living space, needs for food, shelter, water) and adapt the design to them as well.

- Try to imitate as many ecological niches as possible. Each such niche will further enrich the space with plant species, and indirectly animal species (Trees of high canopy, medium and low canopy, shrubs, fruit and nut species, meadow, rocky, pond...)

Maintaining parks that already exist in cities can increase or decrease overall biodiversity. Parks that are basically trees of the same species and the same age, planted at regular intervals on a frequently mowed lawn are not exactly some basis for a diverse wildlife.

- Redesign of such parks is one of the options.

- Gradually introduce new plant species into the park

- Form "wild" zones, with uncut bushes, unmown parts of the lawn

- Do not remove pruned branches and cut grass from the park area. A pile of branches left in some parts of the park can be a habitat for many animals.

- Chop all excess branches with a wood chopper and spread over the soil surface. If the branches are infested with a parasite, wood chips can be composted on site. The heat of a well-composed compost pile will destroy the eggs and larvae of insects, as well as the mycelium of parasitic fungi.

Unwanted species or overpopulation of some wild species

Rapid urbanisation and expansion of the city takes up space from nature and agricultural land. Many wild animals that we could only meet in the wild, now seek their habitat in cities. Suburbs with fenced or unfenced green gardens, spacious city parks and public green areas are desirable habitats for small and large herbivores. Depending on the location and proximity of natural habitats, rabbits, various species of deer and wild boar also come to the city. Some animals (crows, magpies, blackbirds, migratory birds) will choose the city space as a wintering place. The air and soil temperature in the city is always higher than in the immediate vicinity (large thermal mass of buildings, roads, heated streets, heat escaped from heating apartments, engines of vehicles and machines).

- Excessive numbers of herbivores (e.g. deer) can significantly degrade the green cover: Animals do not know the concept of private property, hungry animals will graze on your flower bed as well as grass or shrubs in the park.
- Wild animals are often killed in traffic accidents. They are a direct danger to lives, as well as to private property (damaged and destroyed cars).
- Seeking shelter and food, animals often enter unsecured basements, garages, and even apartments (depending on the location, e.g. squirrel, raccoon, marten, monkey).
- Sometimes they bite electrical cables in buildings and parked cars (fire hazard).
- The animals that occupied the city space are gradually losing their fear of people. People sometimes perceive wild animals as cute creatures from movies, so they feed them and approach them too close. This two-way altered perception often leads to a direct attack by a wild animal. There have been cases of attacks by deer, squirrels, crows... - Flocks of birds that have chosen the city for permanent or temporary living space, pollute public spaces (lawns, playgrounds, squares) with large amounts of faeces.
- The presence of a large number of wild animals increases the risk of zoonosis, either by transmission and infection of pathogens, or by the spread of parasites (which can also cause the spread of disease). Both people and their pets are directly endangered.
- A large number of herbivores, and generally desirable prey, can bring predators to the city or to the periphery. If there are any in the wider city area, it is likely that they will also appear in the city. Depending on the location, foxes, jackals, martens, snakes, lizards, birds of prey, day and night also live in the city and next to the city. These little predators are not a direct danger to humans. But a problem may arise if large carnivores and omnivores begin to perceive the city as their hunting ground. Big carnivores in the city may or may not be a problem. Some cities (and cultures) are accustomed to close coexistence with large carnivores (hyenas in Ethiopian cities), some cities are still looking for ways to coexist (bears in Japan and USA), and some are experiencing real dramas with the recent invasion due to destroyed natural habitats. bears, Romania).

- Leopard https://blog.nature.org/science/2018/03/08/urban-leopards-can-save-lives-by-eating-feral-dogs/
- Spotted hyena https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7765435/
- Black bear https://wildlife.org/urban-areas-can-be-ecological-traps-for-black-bears/
- Polar bear https://www.theguardian.com/world/2019/feb/13/churchill-canada-polar-bear-capital
- Brown bear https://www.reuters.com/business/environment/romania-lets-towns-shoot-encroaching-bears-angering-green-groups-2021-07-22/
  https://mainichi.jp/english/articles/20211112/p2a/00m/0na/043000c

Controlling the behavior of animals, reducing the population or completely removing the species from the urban area can be done in many ways, depending on the reason for the intervention, the ultimate goal, the animal species and legal regulations. We implement such measures for several reasons.

Reasons for intervention

Biodiversity loss and ecosystem degradation

1. The city ecosystem cannot regulate the population of a species on its own
2. Excessive population endangers and destroys other species
3. The species directly destroys habitats

Ways of intervention

- Removal or damage of eggs or nests (over populations of birds)
- Hunting (birds, medium and large mammals, reptiles)
- Trapping of live animals, relocation (small and medium native animals)
- Trapping (small, medium and large animals)
- Fencing (medium and large animals)
- Frightening devices (birds)
- Repellents (small, medium and large animals - mammals)
- Rodenticides (mices, rats)
- Water level control devices (beavers)
- Surgical or chemical castration or sterilisation (medium and large animals, mammals)

Most of the listed ways of controlling urban wildlife are not allowed to ordinary citizens, for larger interventions in the population of the species we need people who are trained to handle weapons, equipment, and resources that we need for such actions. Also, some animals are too dangerous, and handling them requires both knowledge and experience (e.g. bear or deer). They are most often performed by city or state services, or authorised persons, with appropriate knowledge, equipment, and licences. Ordinary citizens are left with a few basic measures they can take to try to reduce the unwanted impact of wildlife on their lives and property.

LEARNING OBJECTIVES

Knowledge

- To learn how human activities affect biodiversity.
- To gain knowledge on how to positively affect the biodiversity of the urban ecosystem

Competences

- To learn why disturbances in the ecosystem occur.
- To understand which human activities are harmful to the ecosystem and to what extent.
- To learn to find ways for people and wildlife to coexist in urban conditions.

Skills

- To learn how to directly affect urban wildlife populations.
- To acquire knowledge for personal protection and protection of property from unwanted wildlife.

PREPARATION/MATERIALS/TOOLS

- Wooden sticks, reeds, bamboo
- Boards
- Paint
- Nails
- Screws
- Saw
- Measuring tape
- Hammer
- Screwdriver
- Wire mesh

STEP BY STEP/HOW TO

1. Construction of an insect hotel / birdhouse / bird feeder / drinker, according to the selected project, choose a design and make a list of tools and materials.
2. Find the model, scheme or design we want to reproduce.
3. Make a functional insect hotel.
4. Place the most successful (decision by consensus of learners - decision-making exercise) in front of the classroom.

The aim of the workshop is for the learners to make a concrete project for raising biodiversity, and to rest their heads and get their hands busy.

REFLECTION QUESTIONS

- Why is there a reduction in biodiversity in the city?
- Is it possible to establish a completely stable urban ecosystem and why?
- What would happen if you were completely passive towards urban wildlife?
- Consider several possible scenarios...

MODULE 4.2 MAMMALS AND BIRDS

Mammals and birds: Their Urban habitats, benefits and control

DURATION: 2 HOURS

DESCRIPTION

This lesson talks about some species of birds and mammals that have adapted best to life in urban conditions.

GOAL

The goal of this lesson is to learn which species have prospered the most by choosing a city as a living space, and to learn the importance of urban habitats. To understand and learn about human-wildlife benefits and conflicts. To recognize the opportunity and need to manage the urban environment to benefit wildlife and people. To recognize possibilities for managing coexistence of people and wildlife in cities. An Understanding of the type and nature of human-wildlife interactions within urban environments, to help manage, mitigate or even promote these interactions.

INTRODUCTION / BACKGROUND

Urbanisation alters wildlife habitats. For populations of some species it causes local extinction, other species tolerate some changes, while a few species adapt. Urban animal communities are generally characterised by lower species diversity. The loss of species in urban areas is generally attributed to habitat degradation and fragmentation, the loss of vegetation and the simplification of vegetation.

Although the numbers of species are reduced in urban areas, animal biomass and density typically are higher. Synurbization is an adjustment of animal species population to specific conditions of the urban environment. Urban development destroys habitat required for many species, modifies habitat of others, and creates new habitat for some species. Species that are opportunists with regard to food and habitat needs are capable of using a wide range of food resources and habitat types. Often, a few species become super dominant in the city. Mammalian populations that have adapted to the urban environment commonly have higher densities, higher rates of survival and reproduction, lower rates of dispersal and show different behaviours from rural populations. Migratory behaviour is typically reduced in urban birds. Improved longevity and survival in urban areas results from warmer and dryer clime during winter, various food sources and lower predator pressure.

The result of these conditions is a weaker individual selection in urban populations. Urban mammals and birds also alter their diets to consume more anthropogenic foods and use buildings, culverts, and bridges for shelter. Prolonged circadian activity is connected with artificial lighting and the tendency of animals to spend the hours of most intensive human activity in shelters. However, the high population densities of urban adapted species make them more susceptible to disease outbreaks and parasites.

A greater density of people as well as animals create conditions that can propagate disease transmission. Most damages or problems caused by urban wildlife include damages to landscaping such as lawns or fences, loss of crops or low-level damage to cars or property. Urban animals can play a keystone role through different mechanisms that include top-down control through predation or regulation of other species through competition and predators of pest species. Urban wildlife in urban green spaces can provide a range of positive values to humans, including opportunities for physical utility, recreation, health and overall well-being. Many conservation efforts inside cities are focused on planting more trees and green outdoor spaces. These spaces provide habitat for wildlife in urban areas. Examples of such spaces are green roofs, urban tree canopy, native plant gardens and native landscaping, backyard ponds, bat and bird roost and nest sites on buildings, bridges, and utility poles.

But in majority of cases, planting efforts are not planned to contribute directly to facilitate the return of urban avoider species to urban areas, urban utilizers to increase their abundance, and to control populations of urban dwellers when they are not natives or affect the abundance of other species. Knowing which species are urban avoiders, urban utilizers, and urban dwellers—and their habitat needs—should be baseline knowledge for designing urban habitats.

The most populous animal species in the urban environment has a specific evolutionary path. The evolutionary path that animal species have traversed is closely linked to changing human habits.

Nomads, hunter-gatherers, are gradually becoming farmers. Wild grasses whose seeds were collected during the season begin to be intentionally sown on cultivated plots. They choose the plant species that best suit their needs. Rice, wheat, barley, spelt, oats, corn are still the basis of the diet of most of humanity. Surpluses are stored and consumed throughout the year, until the next harvest.

With the way food is produced, the way we live is changing. Permanent dwellings, small villages of several houses through several generations become the first cities. And animals, from competition in collecting seasonal food in nature, become the first neighbours of the first farmers. Food is available to them, as well as to people throughout the year, human shelters provide them with an excellent living space, and the proximity of the hosts keeps predators at a decent distance.

Let's look at which animal species are most numerous with humans, and which are their primary habitats:

Mammals

The brown rat (Rattus norvegicus), after man, is the most widespread mammal on the planet. It is about 25 cm long and weighs up to 350 g. Females are slightly smaller, and their body weight rarely exceeds 250g. It is believed to have originated in northern China and is present today on all continents except Antarctica. Today's prevalence is due to man. It quickly adapted to life close to people and eating from human supplies and waste. It achieved its greatest spread until the 18th century as a blind traveller on large sailing ships. The largest part of its diet are cereals, but this rodent is not picky. It is an opportunist and omniscient and will eat any food available to him. It knows how to swim and dive, ite is very intelligent and adaptable, and it learns quickly. Introduction to ecosystems that evolved without rats is most often catastrophic for native species.
It is able to fish, dive for shells, and hunt birds the size of ducks. Even cannibalism is not foreign to them. It is a weak climber and builds nests underground wherever possible These rodents live for a maximum of three years. Females can have five litters a year, with at least 7 young in each. The young rat becomes sexually mature after three months. Some sources state that the population of brown rats in some cities exceeds the population of humans in a ratio of 1: 1.5. It is a carrier of many diseases dangerous to humans, including plague.
https://en.wikipedia.org/wiki/Brown_rat

Black Rat (Rattus rattus) This rodent is slightly smaller and lighter than the brown rat. The largest specimens reach 18.25 cm, body weight up to 230g. It is native to Southeast Asia. It is believed that the spread from the native habitats began with the development of trade between ancient Rome and that part of the world. It spread to Europe, becoming an unavoidable inhabitant of ancient and later mediaeval settlements. Like the brown rat, it took advantage of the voyages of large sailing ships and spread around the world as a blind traveller. It doesn't dig dens if it has a choice. It prefers to stick to elevated habitats, so its canopies and ceilings are much more like shelters. In the wild it has entered as an invasive species due to significant damage to the local flora and fauna. Globally, it is not as numerous as the brown rat. The population decline of this species begins with the arrival of the brown rat in its habitats. Also, the decline in numbers in human settlements is associated with the method of construction and choice of materials. Wooden constructions of houses and roofs are becoming rarer. They are replaced by concrete, brick and concrete elements. And the black rat is considered a carrier of the plague.
https://en.wikipedia.org/wiki/Black_rat

The mouse (Mus musculus) or house mouse, a rodent, is significantly smaller than a rat. They grow exceptionally up to 10 cm, without tail length, body weight up to 45 g. prefers plant foods, seeds, nuts but will not refuse foods of animal origin. It is spread all over the world, and for life it prefers to choose areas close to people. The pregnancy of a female mouse lasts for 21 days, and the young mouse is sexually mature after 6 weeks. One female can have up to eight litters per year. Its favourite habitats are the basements and attics of family houses. It also likes to make nests in the insulation between the partition walls. Apart from private houses, it is also common in food warehouses. It often travels hidden in goods sent from one warehouse to another, even between cities and states. Some other species from the large family of mice will take advantage of the proximity of humans, but the house mouse is still our most common companion.
https://en.wikipedia.org/wiki/House_mouse

Control of the rodent population in the city is done by utility companies or authorised persons. Poisonous baits are most often left in places where they are present. What we, as residents of the city, can do to reduce their number is:

- Make it difficult or impossible for rodents to access food; Dispose of food waste in tightly closed containers

- Prevent them from penetrating our living space; secure all potential entrances by closing or covering with metal mesh

If rodents still endanger our space (garden, garage, basement...), we can apply some more active methods;

- Get a cat or a dog. Cats are natural predators of rodents, and a cat that regularly patrols its territory by its very presence will make our space unattractive to rodents to inhabit or occasionally visit. Most cats will actively hunt small animals. And many dogs (terriers, dachshunds, pinschers, greyhounds...) will gladly run after a mouse or a rat.

- Installation of ultrasonic devices and chemical repellents that repel rodents.

- Setting different traps and mousetraps, purchased or diy

Rodent hunting is also one way of control. In many cities there are groups of people who love hunting and city rats are their favourite game. Methods of hunting in urban conditions are not too different from hunting in the wild:

Birds

The pigeon is a common and numerous animal species in cities. Man has been cultivating them for over 3000 years. They were bred initially for food, and later ornamental species, postmen and fliers were bred by selection. All tame pigeons originate from the species of rock pigeon (Columba livia) domiciled in the Mediterranean and the Middle East. And city pigeons (Columba livia domestica) are simply feral tame pigeons that have continued to breed on their own. And in doing so, they probably mated with their wild relatives. City pigeons have replaced sea cliffs and ledges on which their wild relatives have built nests with city buildings. In the wild, the pigeon feeds on the seeds of plants we consider weeds. City pigeons mostly eat the remains of human food. People in the cities fed them, so they lost their fear of man. They come very close to man. Bird lovers feed them, haters call them flying rats. Sometimes they multiply so much that their faeces become a communal problem. It is very acidic, so it physically damages monuments and facades. Although the rock pigeon (or his domesticated descendants) is domiciled on the old continent, European immigrants brought him to America and Australia. So large flocks of pigeons can be seen in most cities of the world. There are several diseases we can get from pigeons.
https://en.wikipedia.org/wiki/Domestic_pigeon

We have mentioned only a few species, typical of most cities of the world. In the cities where they live, their populations are stable and large. Of course, there are exceptions. For example, in the cities of Alberta, Canada, there are no brown rats and no pigeons in Darwin, Australia. Each city has its own specific fauna. These animals are not the only opportunists who find food and a place to live in the city. Somewhere they are raccoons, somewhere crows or starlings, parrots or monkeys. Most often local animals that have simply expanded their territory. Or we built a city in theirs.

Whether it is a (almost) ubiquitous rat or a fox, a crow, or a local species, they have one thing in common. All animal species that have built large successful populations in urban conditions are opportunists, most often omnivorous, adaptable, intelligent, quick learners, and very resourceful. They are able to inhabit various ecological niches, adapt to different habitats, adapt activities to the time of day when the dangers are least.

Highly specialised animal species are much rarer in the city. Either by habitat type or by diet. Animals that eat only one type of food (e.g. panda - bamboo, koala - eucalyptus), can only inhabit narrow areas of the city if they meet their specific needs.

This link leads to an atlas of birds that nest in the city of Zagreb. More than a hundred bird species, songbirds, birds of prey, and wetland birds have been recorded and mapped.

http://atlas-ptica.azo.hr/

The Atlas of Urban Birds will surely be different in Toronto, Helsinki or Johannesburg.

LEARNING OBJECTIVES

Knowledge

- To learn which animals live in our immediate urban surroundings and where.
- To gain insight on the benefits of animals in urban habitats.

Competences

- To learn why it is important to maintain urban habitats for animals.
- To learn about the benefits and disadvantages of animals in the urban environment.
- To understand how control of animals should be implemented correctly.

Skills

- To learn how to identify urban habitats of animals
- To gain skills in managing adequate control of animals in urban habitats.
- To gain know-how in identifying animals, their needs and benefits.

PREPARATION/MATERIALS/TOOLS

- List of animals from previous exercises
- Available online materials

STEP BY STEP/HOW TO

My city is the habitat of these bird species:

(make a new list, or mark on an existing one)

1. Endangered species
2. Population is too small
3. Stable population
4. Population is too big
5. Invasive species

Open discussion:

- Should the population of some species be increased, which, why, how
- Should the population of some species be reduced, which, why, how

REFLECTION QUESTIONS

- Why is preservation of urban habitats important?
- How do urban surroundings and human activity affect animal species?
- How does the presence of wildlife in urban areas affect humans and the environment?
- What would happen if wildlife was completely removed from urban habitats? And what would happen if it gets out of control?
- How can you affect restoration and management of habitats on a personal level?

Insects and pests: Their Urban habitats, benefits and control

DURATION: 2 HOURS

DESCRIPTION

This lesson will familiarise the learners with insects and pests in the urban environment. The learners will gain insight on the areas insects and pests inhabit, how they can be beneficial to the environment and also how to control them when needed, while maintaining the natural balance.

GOAL

The goal of this lesson is for the learners to gain understanding of the role insects and pests play as a part of the ecosystem. Being that often insects and particularly pests can influence the quality of everyday life in an urban environment, this lesson should let the learners understand if an intervention to get rid of them is justified and when it is just arising from the psychological effect of fear or disgust which has culturally come about in the urban environment.

INTRODUCTION / BACKGROUND

First of all, it is important to begin to raise awareness that all living beings, no matter how small or irritating they may seem , have a role in the ecosystem and they appear in a certain area for a reason. Most often pests are an indicator of a disbalance in the ecosystem and the very insect or pest that seems to be intruding in our space or attacking our plants is there to obtain its essential needs - food or shelter.

Even the general mindset that these living beings are intruding our urban environment should be questioned, as it is actually a common environment for all and all beings should find a way to cohabit in it. In an urban setting we can see insects every day,

When it comes to insect and pest control in cities, some very drastic, non-ecological or even non-ethical approaches exist like spraying pesticides from aeroplanes (for example against mosquitos) which while it does decrease the population of the insects and pests also drastically influences air and water quality which subsequently negatively influences humans as well. These methods should be avoided and the local authorities motivated to come up with more gentle solutions to these issues, or rather to investigate the causes of these infestations happening rather than simply removing the effects.

Insects and pests depending on their natural habitats will try to imitate them in the urban environment - some will choose dark and damp areas like the bathroom of an apartment or a building's basement. Others will look for a dry place like the cellar, near books or closets. Most of these insects are harmless and are simply looking for shelter, and once the fear or disgust is overcome any person should be able to remove them to the outdoors.

Some insects like cockroaches can sometimes be bearing disease. To control their infestations in an urban environment the causes should be removed - simply by not leaving food outside and maintaining cleanliness. On a larger scale, cockroaches are nesting in sewers which is an urbanism issue in some cities / countries where the sewers were not planned in a correct way.

Ants are mostly harmless but can cause problems in a household so the same measures of maintaining cleanliness and not leaving food outside helps most times.
Other insects like flies and butterflies might visit our homes and should never be killed but if they are intruding, should be gently removed when possible.

The urban outdoors are full of insects but they mostly avoid humans. Many of them are pollinators and find shelters in grass, flowers, fallen leaves or branches - it would be best not to remove these habitats to maintain a healthy ecosystem in the city. Insects are food for larger animals like rodents which if they find their food outdoors will not come closer to the places where people live.

When it comes to pests, they will appear on plants when they run out of food elsewhere. It is justified to remove them via natural methods. For example using plant-based solutions (nettle, comfrey, neem) will reject most pests. However, this is also a disbalance in the system and at many times we can witness that pests are eaten by insects like ladybugs or by birds.

LEARNING OBJECTIVES

Knowledge

- To learn about insects and pests and their habitats in the urban environment
- To gain insight on the benefits of insects in the urban environment

Competences

- To learn why how to identify urban habitats of animals
- To familiarise the learners with the benefits and disadvantages of insects and pests in the urban environment
- To understand how to approach the control of insects and pests

Skills

- To learn how to identify urban habitats of insects and pests
- To gain skills in managing adequate control of animals in urban habitats.
- To gain know-how in identifying insects, their needs, benefits and possible disadvantages.

PREPARATION/MATERIALS/TOOLS

- Books or a presentation on local insects and pests.
- Paper, pencils

STEP BY STEP/HOW TO

Identifying local insects and pests

1. Show pictures of at least 10 various insects and pests found in the local environment.
2. Identify the names and characteristics of the insects and pests together with the learners.
3. Have the learners choose an insect they will research, or distribute them in groups and let every group analyse one insect.
4. They should identify their habitats, benefits and possible dangers they can bring to humans.
5. Discuss about possibilities to control the insects and pests - what methods can be used and are they environmentally acceptable. Research why an infestation of a certain insect or pest occurs.

REFLECTION QUESTIONS

- Which insects and pests appear in your urban environment?
- How are insects and pests a part of the food-chain?
- What happens if all insects are removed from the urban environment?
- Which methods can be used to control insects and pests and not to drastically intervene with the natural ecosystem?

MODULE 4.3 INSECTS, PESTS AND BEES

Importance of insects and bees in the Urban environment and Beekeeping

DURATION: 3 HOURS

DESCRIPTION

In this lesson the learners will learn about the importance of insects and bees, their role in urban ecosystems and ways to contribute to their well-being.

GOAL

The goal of this lesson is to raise awareness of the existence of insects in urban conditions and their role in urban ecosystems. Depending on their direct or indirect impact on human life in cities, the goal is to develop optimal strategies in relation to insects and bees.

INTRODUCTION / BACKGROUND

Although in cities, due to fewer green areas and potential feeding areas and shelters, the number of insects is not as numerous and diverse as in their natural habitat. We can still witness the coexistence of different insect species near the city, especially in the suburban areas. Through actions, man has the opportunity to make a positive impact and provide better conditions for the survival and development of insect communities that enhance natural processes and enrich urban biodiversity.

There are many examples in which urban green areas are arranged by planting plant species that favour insects and planting honey plants that are a source of food (nectar), both for bees and other insects. By designing urban spaces according to the permaculture principle of peripheral spaces, we create conditions for the life and development of insects. In addition to the pollination functions and contributions to the development of the plant world, urban insects are an important link in the food chain and food for reptiles, rodents and birds, as well as microorganisms. Also, by achieving balance in urban ecosystems, we achieve population control and prevent the problem of invasion of certain species.

There are many examples of beekeeping in cities, and in addition to achieving the above positive functions for the environment, we can also get surplus honey produced as an additional useful by-product of their action.

LEARNING OBJECTIVES

Knowledge

- To learn about the importance of maintaining urban habitats of insects and bees
- To gain insight on how the urban environment is shaped with the help of insects and bees
- To gain knowledge on the possibilities within urban beekeeping.

Competences

- To learn why insects and bees are important to the urban environment
- To familiarise the learners with the interconnection of human habitats and that of insects and bees.

Skills

- To learn how it can be possible to start beekeeping in an urban setting
- To gain know-how in the basics of beekeeping.

PREPARATION/MATERIALS/TOOLS

- Projector and projection screen
- Board / magnetic board, chalk / markers
- Paper, pencils and crayons
- Books about insects and bees
- Infographic on benefits of insect and bees in urban environments
- Designs for making beehives
- List of honey plants and trees

STEP BY STEP/HOW TO

Knowledge of insects and their habitats

1. Introduction. We show different photos of urban locations (differently maintained green areas, buildings...). We talk about individual locations and living conditions for insects in them. We encourage students to think about what would change if they intervened in these locations: changing, adding or removing plants, building and adding new elements...

2. We list and write on the board the insects we know and the students' attitudes about them - positive and negative. Along with each species, we list the functions that this species has in the ecosystem.

3. The following is a presentation with examples of insects found in cities, their habitats and the impact on their living conditions.

Design a suitable environment for bees and urban insects.

1. We present successful examples of beekeeping in urban conditions and positive and negative experiences of beekeeping in cities. We look at legislation, benefits and dangers, and ways to improve the environmental conditions for bee life.

2. We talk to students about the possibilities of beekeeping in their own city.

3. We apply the knowledge learned in the previous lessons and consider possible positions for planting honey plants and trees.

4. We offer several designs of beehives that can be made using a do-it-yourself method.

REFLECTION QUESTIONS

- Why are urban conditions unsuitable for certain insect species?
- Which favours the development and life of some species?
- What happens if bees disappear from the ecosystem?
- How can you affect the increase in biodiversity in your city?

MODULE 4 URBAN WILDLIFE

REFLECTION & What's Next?

DURATION: 1+ HOURS

DESCRIPTION

Each of the 4 modules (Introduction, indoor and outdoor permaculture, and urban wildlife) will end in an evaluation, where the students reflect on their overall learning from each module. The evaluation can be done individually or in small groups. The evaluation is a mixture between answering reflection questions, making visual presentations and presenting in continuing the dialog in plenary.

GOAL

The purpose of making evaluation is to provide the students help to reflect deeper on their learning, by creating visual material which can strengthen their ability to remember their learning from each module, as well as strengthen their presentation skills.

INTRODUCTION/BACKGROUND

The course will be using a multifaceted approach to kinesthetic learning; students carrying out physical activities and working with their senses to enhance the memorization of the content.

LEARNING OBJECTIVES

- Learn how to reflect upon your own learning.
- Gather knowledge from the different areas of Urban Permaculture.

PREPARATION/MATERIALS/TOOLS

NOTE: It is important that the students collect their reflections in a logbook (physically or digital) during the different lessons, as well as collecting materials such as photos, drawings, models etc. All these materials are the basic materials for the reflections exercise. Depending on how digital the students are….

- Computers.
- Visual Digital Boards similar to miro.com
- Phones with cameras or cameras.
- Paper
- Crayon, pens etc.
- Printer

EVALUATION

DURATION: 1+ HOURS

STEP BY STEP/HOW TO

STEP 1

Each student (or small group) looks through the notes, photos, models etc. collected during the module and reflects on the learning guided by the following questions. The reflection questions will be coloured depending on if it is a reflection on the introduction, the indoor - or outdoor permaculture or urban wildlife:

What did I learn? (about urban permaculture in general, or indoor - or outdoor permaculture or urban wildlife)

What is the most important thing I take away from this?

What surprised me?

What elements do I see that I could use sometime in the future?

What inspired me the most?

If I should tell someone about urban permaculture, what would they need to know?

Make a short visual guide.

STEP 2

Each student (or small group) presents their guide and learnings in plenary and receive feedback from the class and teacher in an informal and appreciative manner, since the purpose of this evaluation is to reflect on the learning and not an exam. The guide can be a powerpoint presentation, a short video, a poster or zine (small magazine).

NOTE

Examples of presentations (graphic design) will need to be included.

Permaculture Dalmatia core team (from left to right):
Zoran Vukšić, Marija Hajdić, Ivan Rako, Ivan Mateljan, Marin Kanajet, Vedrana Vučenović, Antonija Mihaljević and Marko Ban

PERMAKULTURA DALMACIJA / PERMACULTURE DALMATIA

Permaculture Dalmatia started as a non-formal organization in 2012. It was originally founded by a variety of experts in the fields of agronomy, architecture and urbanism, forestry, sociology, philosophy, pedagogy, economy, medicine, geography and art. The organization also brings together scholars, activists, outdoorsmen, youth workers, trainers, as well as a number of artisans. In the beginning the group was focused on experience-sharing activities and building practical knowledge as well as research in all areas concerning permaculture and permaculture design. It started with educational and promotional activities early on, which resulted in a growth in numbers and with it, in experience and confidence to make an impact in their surroundings.

The group became a formal non-governmental organization in 2014. with the aim to pursue in-depth research activities, professional development, common project goals and professional development in the field of sustainable and regenerative design. The collective goal of the members of Permaculture Dalmatia is to steer positive environmental impact in a regenerative manner, apart from merely preserving it. They aim to spread and exchange knowledge about permaculture but also to network various professions with permaculture as the key guide in realizing common goals, entrepreneurial achievements and guiding the social/economic and environmental paradigm shift. Members of Permaculture Dalmatia support each other in their professional and entrepreneurial development by introducing permaculture/sustainability/regeneration in standard affairs. In that process the NGO functions as a platform for development of innovative social enterprises.

Permaculture Dalmatia aims to pass on the knowledge and skills to younger generations through their program, as well as to share knowledge and skills with other organizations. Their partners are NGOs, GO's, farm managers, agencies, initiatives, public and educational institutions, social enterprises, companies and individuals."

FGU AARHUS, DENMARK

FGU Aarhus is a VET institution that provides Preparatory Basic Education. The institution was formed in 2019 from the consolidation of several schools following educational reforms in Denmark, that led to the establishment of preparatory basic education (FGU) to create coherence in the preparatory education offers available to young people.

FGU Aarhus offers vocational education for young people aged 16-25, who need professional, personal and social development and/or in need of overcoming challenges to be able to enter traditional secondary education or employment.

FGU Aarhus students are offered three educational pathways: general preparatory education (AGU), vocational preparatory education (EGU) and preparatory education with focus on production (PGU). The teaching at FGU Aarhus focuses on practical work through production of different products and services. FGU Aarhus offers 12 vocational lines such as Building, housing and facilities; Music and artistic production; Care and health; Trade and customer service; Engine and mechanics and others, as well as general subjects such as Danish, mathematics and English.

CENTRAL EUROPEAN CHAMBER OF COMMERCE, POLAND

Central European Chamber of Commerce is an association of more than 200 entrepreneurs who are interested in development, implementation of innovative solutions, and establishing of new contacts in the free market economy with the respect to the principles of corporate social responsibility (CSR).

The task of the Chamber is to create partnerships between companies on a local and international level. The Chamber builds systems within which it implements projects, and provides access to new clients and to financial, legal, and administrative solutions to cooperate at every level of development.

The activities of the Central European Chamber of Commerce are addressed to all industries existing in the economic space. All companies are invited to join regardless of their size and country of origin. Together, conditions for the management, internationalization, and growth of every business are created.

INTERCOLLEGE, DENMARK

InterCollege is a social enterprise within the field of Education and Capacity Development, with key competences in cultural, civic and entrepreneurship education. InterCollege aim is to innovate education by facilitating bespoke education, being a counterpart to educational providers and mobilising and connecting People, Ideas and Resources.

InterCollege is an active actor in the VET sector and has developed project management standards for VET mobilities based upon value creation indicators. Together with pre-vocational schools in Denmark, InterCollege also developed a pre-vocational course in Maritime education.
InterCollege is part of various mobility consortium in Denmark, facilitating VET traineeships for VET learners with special needs. At the same time, InterCollege facilitates work-based placements in Denmark for VET learners across Europe.

INTERNATIONAL INTERNSHIPS, ROMANIA

International Internships is a private company founded in 2018 with the purpose of building consensus between the demands of the private sector and the challenges of the educational sector, to offer young people a broader perspective of opportunity when it comes to vocational education.
The company has a wide network of placements for VET work-based learning on the Romanian market and strong cross sectoral partnerships built with the help of the past experience and collaboration with Embassies, VET schools and the private sector.
International Internships strives to engage companies in playing a role in the vocational education of young people, and furthermore, strives to support students to integrate into an EU labour market by giving them tools to become more active and competent in local and European society.
Most of International Internships' efforts are concentrated into matching vocational education practices and frameworks, and the skills and potential of challenged young people, with professionals, companies or institutions, that are active in the same field as the young people, in order to offer them practical experience, and pathways to employment or further education.
Additionally International Internships works toward engaging the civil society in taking part in the inclusion of young people into European Union unity by offering them tools to become more active in the local and European society, by organizing different types of activities such as seminars, training's, local, national and international meeting, etc. International Internships also engages in European projects and partnerships in different topics around vocational education and entrepreneurship.

KOCAELI PROVINCIAL DIRECTORATE OF NATIONAL EDUCATION, TURKEY

Kocaeli Provincial Directorate of National Education is a regional public authority decentralized structure of the Ministry of National Education, embraces 12 district directorates and executes activities to improve the quality of education and access the education in the region.
As a governmental organization in charge of the planning and coordination of all kinds of educational and training activities from preschool, to secondary and adult education in Kocaeli Province. The number of schools/institutions under its responsibility is 1.300 including preschool institutions, special needs institutions, primary schools, secondary schools, vocational secondary schools, vocational education centres, Public Training Centres for adults, and Counselling and Research Centres with a total of 26,000 teachers working in those schools and institutions.

Apart from formal education institutions, adult education centres such as public education centers and vocational centers are also under its responsibility. In total, there are more than 26,000 teachers and nearly 400,000 students in all levels of education, except higher education.

INTERBILDUNG, GERMANY

InterBildung e.V. is a social enterprise) with the primary goal to support education, science, and research, and to promote intercultural cooperation across educational sectors and with private sector and public sector stakeholders. It is aimed at encouraging the dialog and interactive exchange of organisations staff and learners by means of international communication and socio-cultural discourse.
InterBildung focuses on supporting innovation and improvement of vocational education and training and supports the development of learning opportunities that provide learners with both practical skills and competences as well as enabling them to acquire intercultural knowledge and a better understanding of European identity and cross-cultural interactions. InterBildung does so by developing cooperation with German universities and vocational schools, chambers of commerce and other economic and/or industrial associations to provide support for the exchange of values, practices, experiences as well as the acquirement of new skills, knowledge, and qualifications. Furthermore, InterBildung provides free support for vocational schools and private sector stakeholders to establish professional partnerships locally as well as across and beyond the EU.

This Manual is the result of prominent efforts of our project partners throughout a three-year process. First and foremost, our deep appreciation is directed towards our partner organisation in Croatia, Permaculture Dalmatia, that fully dedicated in this process not only their know-how and enthusiasm, but also priceless time of hard work. With your dedication, this Manual became more comprehensive than we initially hoped for.

A sincere thank you to our partners from Turkey, Poland, Romania and Germany who tested the first draft of the Manual with VET learners, teachers and stakeholders from the labour market. Your findings formed this Manual, ensuring that it efficiently addresses a broad range of well-defined learning objectives.

To our long-term partner, InterCollege, thank you for your continuous support and inspiration.

Last but not least, the production of this Manual would have not been possible without the support of our project coordinator, Anna Margrethe Andersen.

Claus Bentsen
FGU Aarhus
May 2023

CECC

FGU AARHUS

PERMAKULTURA DALMACIJA

InterCollege

URBAN PERMACULTURE

INTERBILDUNG e.V

TÜRKİYE CUMHURİYETİ MİLLİ EĞİTİM BAKANLIĞI KOCAELİ

INTERNATIONAL INTERNSHIPS

URBAN PERMACULTURE