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PROJECT NatureD



#pollinators
#biodiversity
#outdoor education
#garden projects
#species protection
#environmental awareness
#well-being



September 2022

PROJECT PROPOSAL

Key words and key indicators of project:

Pollinators and biodiversity, outdoor education, garden projects, species protection, citizen science, environmental awareness, well-being

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PART I: OUR VISION

Project Description

The level of biodiversity loss is identified through the sheer number of mass extinctions on the planet. The vast and rapid urbanization of Luxembourg brings this planetary boundary to the forefront of discussions on social innovation and sustainable development. This peer group has developed a project for the co-design and implementation of a specific plot of land in Kirchberg in order to enhance biodiversity and human well-being.

In line with their personal convictions and professional backgrounds, the four group members agreed to give the project a strong educational character, with an initial direct link to the students of the European School Luxembourg I (EEL) who are based in close proximity to the plot of land.

Our vision for the plot is to create an inviting and inspiring space for learning. However, lessons in biodiversity and didactic activities with EEL are not the only possible uses. Nearby schools, camps, teams and groups within the community will also have access to the space for similar purposes. Local schools of Kirchberg could become partners with EEL as part of the biodiversity planning and expansion of the educational content.

Additionally, nearby businesses could use the space for team meetings, summer camps could gather and sports teams could strategize on their next game. These types of reunions will also serve to expose these groups to surrounding biodiversity and potentially engage with further educational content that can be made available as part of designed didactic tools. This vision of expansion for this project goes well beyond the specific lesson plans for the students of EEL. Our educational concept serves as a starting point to demonstrate the possibilities and capacity of the space for learning and interacting with nature.

Through careful planning and reflection, the group proposes to develop the space in a way that invites learners of all ages to connect with nature through experiential learning that emphasizes the importance of biodiversity and pollinators. Our goals are correlated to the selected biodiversity indicators that have been identified as a priority for the purposes of this project.

This report serves as an explanation of our intentions for the space:

- *The installation of a natural outdoor learning space for students;*
- *A didactic toolkit that serves to enhance the positive impacts of the transformation through guided activities and lesson plans.*

1. Observing and recording existing biodiversity

Parc Central in the Kirchberg area is a well used park by many community members and thanks to the hard work and attention of the commune, many different plant species and trees have been integrated into the park setting. The group plans to use the existing biodiversity as a learning ground and laboratory to explore and better understand our connections with nature. By adding some small wooden infrastructure, information panels and a welcoming environment for both pollinators and people to gather, the space becomes a source of inspiration and education.



2. The creation of a natural outdoor learning space for students

Using all natural products such as tree stumps or large boulders, straw and easy to recycle materials, an all-embracing architecture will serve as an outdoor classroom for students from all Luxembourgish schools. The placement of the classroom would further be conducive to socializing for all park users. Those living and working in the Kirchberg district could use the space for outdoor gatherings and events.



3. A didactic toolkit to enhance the positive impacts of biodiversity

To facilitate engagement and increase awareness of local society, especially children, youth or students about the role of biodiversity in the city ecosystem, the didactic tools will create learning opportunities through detailed activity descriptions. Through theoretical (informative panels infrastructure) and empirical experience through sub-projects, these ready-made outdoor scenarios, lesson plans and materials will be made available for teachers and other interested educators. The goal is to have this displayed on a digital open-access platform.



PART II: SETTING THE SCENE

Define the plot of land

The plot of land for this project was offered by **Fonds Kirchberg**, which is the owner of the plot. The plot's coordinates can be found on the following website: <http://g-o.lu/3/Wf3o>. According to the website, the total area of the plot is about **4500 m²** with a length of 305 m. The shape could be roughly described as a triangle (see the photo below).



According to the peer group observations, there are four main sections (land belts) that are divided by rows of trees and bushes. The center section of the site has a sculptured statue and has a larger space, which would be the focal point of the site. Other belts continue on either side of the center row, getting smaller in size towards the gated entrance to the European School. The distance between the average rows is approximately 12 meters. Other rows differ in size as the general shape of the plot is a triangle.



The plot hosts the project **Arboretum**, which represents a collection of protected plant species from all over Europe that can grow in Luxembourg. The selection of the species for the project was done by the Natural History Museum in Luxembourg, which is responsible for the scientific management of the atypical collection. The curator of the project is Thierry Helminger, whose contacts can be found in the stakeholder section.

Importantly, one of the requirements of Fonds de Kirchberg to this project is the integration of the project into the existing plantations of the Arboretum and the park in general. All the following authorizations for plot modifications must be requested from Fonds de Kirchberg, the owner of the land. The plant species are confirmed by Thierry Helminger, the coordinator and representative of the Arboretum project.

The plot was chosen for the reasons of its great location and easy access for the project's target groups. Such accessibility can provide greater value and benefit to the users of the space. Moreover, the plot's proximity to the European School of Luxembourg plays an essential role in the facilitation of the educational component of the project.

Define the stakeholders

Given its complexity and multi-level characteristics, the project entails a number of external stakeholders that will likely have a diverse range of interests and expectations. Below, we provide an outline of all the relevant entities and individuals that were identified to play a role in the proposed project.

This exercise was carried out in alignment with the "co-design" dimension of the project, which not only includes, but also welcomes and values multiple and diverse players and voices.

Having said this, due to their different missions, purpose and extent of involvement in the project, one of the main implementation challenges will be to find common ground and create pertinent and long-standing synergies and partnerships. The project's success is highly dependent on the fruitful collaboration and direct access to stakeholders' knowledge, expert advice and services, as well as to their network of contacts and funding opportunities.

It is important to acknowledge that this aspect represents both a boundary or constraint and an important opportunity to develop the project in new directions, as well as to target numerous other audiences and perspectives.

In order to gauge stakeholders' interests and address their needs, the team proposes the implementation of questionnaires where all interested parties can identify their priorities, make their wishes and point out the areas of concrete commitment and support. In addition, keeping regular contact with each and all stakeholders is highly recommended to ensure the project addresses any new dynamics or unforeseen external factors that may impact, either positively or negatively, the implementation and success of this initiative over time.

1. Fonds Kirchberg

As the owner of the plot of land, Fonds Kirchberg(FK) has been identified as one of the main stakeholders for the proposed project. In an ideal situation, FK will not only grant access rights to the land, but would also provide expert advice, funding and facilitation on obtaining permits for planting and any other authorizations that may be required as the project advances and expands in focus.

Under the supervision of the Minister of Public Works, Fonds Kirchberg is a public entity responsible for the urban planning and development of the Plateau de Kirchberg.

Set up following the Act of the 7th of August 1961, the Fund is administered by a board of directors consisting of nine members appointed by the Grand-Duke, on a proposal put forward by the Government. It is managed on a daily basis by a director and an executive bureau which consists of the director and four members of the board.

Under the 1961 act, several tasks classified as being of public interest were assigned to Fonds Kirchberg. Three still remain today and include the Pont Grande-Duchesse Charlotte, the urbanization and development of the Kirchberg Plateau, and the plateau's road network and related aspects.

The Fund, alone, bears the costs of all expenditure relative to its operation and its investments.

Thanks to the project's mentors, the group has identified Monika Malikova, landscape architect, as the main point of contact for all questions related to the Fonds Kirchberg.

For the purpose of this project, FK has agreed in principle to allow the use of the plot of land for the implementation of a project carried out by students of the Certificate in Sustainable Development and Social Innovation, with further agreements to be reached as the project advances and more concrete information becomes available.

As per an email sent out by Monika Malikova on 28 July 2021, Fonds Kirchberg made the following requests (translated from French into English by the peer group):

- The University of Luxembourg, represented by the peer group, will be responsible for verifying the feasibility of the land belts, in the context of the project's implementation, with the Administration de la nature et des

forêts (ANF) and the Ministère de l'Environnement, du Climat et du Développement durable (MECDD);

- The university must verify the agreement in principle with Mr. Thierry Helminger. Indeed, the Kirchberg parks include the Luxembourg arboretum, the scientific monitoring of which is provided by Thierry Helminger of the MNHNL;
- The project will in no way compete with LUGA projects (which has not been consulted in project discussions up to that point in time). The perimeters of the land must therefore be coordinated with LUGA (LUGA will be the first major national horticultural exhibition in Luxembourg);
- The Fund, through its representatives, will be integrated into the peer group and will play a fundamental role and function of decision.
- The peer group project should bring added value for the Fund's public space and green space. The participatory aspect will have to take center stage in this project.
- Costs related to the development and maintenance of the long-term project will not be borne by FK.
- The project must respect and integrate the natural elements, more precisely the existing plantations.
- The project must fit perfectly into the park and the existing arboretum.
- These conditions are in no way exempt from obtaining all the necessary authorizations from the various existing partners and competent authorities.
- Furthermore, it is likely that other conditions will be issued by the Fund depending on the progress of the project.

As stipulated in Ms. Malikova's email, depending on the scope of the project and the exact focus of implementation, ANF, LUGA and MECDD may need to be included in the list of stakeholders in the future.

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2. Musée national d'Histoire Naturelle

Thierry Helminger – curator of the Arboretum

Thierry Helminger is an important stakeholder, who has been consulted for the ideas on site transformation. Moreover, he could be invited to facilitate a visit to the plot for the school students or a talk in the school about the biodiversity of Central Park in Kirchberg and the plant species students can find there.

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email arboretum@mnhn.lu

3. University of Luxembourg and peer group

Members of the current peer group will be responsible for passing along the project to future cohorts of students of the certificate programme. Interested current members will stay involved in the implementation of the project, helping out either as future mentors, volunteers or as private citizens.

The next peer group that will be responsible for implementing this project in the future, on behalf of the University of Luxembourg, will be tasked with advancing the project, incorporating any future changes in direction and will ultimately be responsible for delivering on the commitments made to stakeholders.

As students of the University of Luxembourg, peer group members will be able to seek constant advice from the project's mentors as well as from Ariane König, Research Scientist and Course Director of the Certificate in Sustainable Development and Social Innovation.

The next peer group will be in charge of promoting and communicating about the project, targeting a variety of audiences:

1. Internally, engaging with students, researchers and university employees;

2. Externally, finding ways to initiate contact and collaborate with Kirchberg-based firms, institutions, residents, schools and other members of the public.

At later stages, students of the peer group may be involved in setting up communications materials dedicated to the project, sharing materials, resources and promoting the resource. Posters, podcasts and other multimedia channels may also be considered in promotional tools for the project.

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4. European School of Kirchberg

This is the target market for the educational concept. An established connection and willingness of the staff to engage the students in the project and provide classroom visitations to the site. Pilot programs on educational tools, evaluation and testing are possible. As well, the group could extend questionnaires to ask teachers and students about their preferences for the use of the outdoor space and various other ideas for lessons coming from teachers and students beyond the peer group.

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Constraints and limitations

Given the project's multifold character, involving a significant range of stakeholders, the constraints and limitations of the projects can only be estimated at this point in time.

Nevertheless, finding common ground among all parties involved will prove challenging and may require time, patience and a lot of flexibility on the part of peer group members.

Getting buy-in from sponsors or other types of corporate partners will require a strategy of engagement and communication, centered heavily around setting up meetings and potentially signing frameworks of collaborations.

Gaining access to and setting up meetings with various experts in order to design the plot to reflect the project's educational character will require time and will likely need to be facilitated by the group's network of contacts.

It is the current group's understanding that the future implementation and design of the project might need to address the regulatory framework put in place to protect certain populations of bats. It is essential that the next peer group engages in a fruitful collaboration with Thierry Helminger from the Musée national d'Histoire Naturelle in order to properly tackle this potential constraint as well as to consult him on the appropriate choice of species to plant, as stated before.

Time is another limitation that must be acknowledged. As the certificate programme is a part-time, evening course, it is likely that future participants will have to juggle various deadlines and priorities in their personal and professional lives. The lack of full-time resources will have a direct impact on the progression speed of the project and the communication flow between and among all stakeholders.

The varying extents of involvement and interest of external stakeholders will likely change the project's course numerous times.

The liaison with authorities and public entities, such as FK, ANF, LUGA and MECDD, and potentially additional ones, will require time, may entail paperwork and will likely make use of significant project management skills.

From the experience of the current peer group, the extent of commitment among internal stakeholders may differ over time. More concretely, enthusiasm may be high at the beginning of the semester, nevertheless, due to a variety of reasons, some student participation and commitment may decrease or cease as time goes by.

Additionally, identifying volunteers and the materials needed for planting are possible constraints in implementing the project. Without support from fellow students or partners, co-designing the plot may prove to be challenging. The same holds true in the event that no financial support or funding is received from future sponsors or stakeholders.

PART III: CREATIVE CONCEPT

Education and Biodiversity

The creation of an outdoor classroom as part of an integrated approach to address biodiversity loss aspires to bring people together to engage in the natural world. The educational infrastructure of the project attempts to create a sense of purpose for the space, where activities and lessons can be developed based on the specific parameters of the design.

Characteristics of the selected plot, the group members and the existing infrastructure are conducive to the creation of a learning space for the students of EEL in order to meet our desired goals.

- **The proximity of the selected plot** to the outdoor access of EEL, allowing for easy access for outdoor learning activities that can be integrated into the didactic tools and lessons.
- **The specific expertise and knowledge base** of the group members in the education, environmental and communication fields, a major driver for the particular direction of the project
- **The existing infrastructure and design of the plot** offers a sufficient opportunity for the creation of a learning space. Current rows of trees that divide the plot into sections help to create the setting for the intended lesson plans. Planting in these various sections can be allotted to involved groups of children where ownership and care for vegetation can take on a long-term role.

1. Student led activities

Activity #1: Engaging students in building insect hotels

Insect hotels are excellent building projects for students to grasp the importance of the ecosystems within a small natural space. Using natural materials (acorns, bamboo shoots, twigs, straw, mulch, etc.) students will build a hotel. Creations are personalized based on the creative design and available materials. Hotels can be hung from trees and set up throughout the plot.



From: Woodland Trust



From: House beautiful



From: Pinterest

Article:

<https://www.sciencenewsforstudents.org/article/bee-hotels-are-open-business>

This activity was conducted by a student as part of an internship that included an article and video on the importance of pollinator protection and how to build an insect hotel. The student worked closely with a NaturED member to source and construct the insect hotel that will be added to the site upon completion.

Further details of this component of the project can be found in **Annexe 1**.

Activity #2: Engaging students and volunteers in mosaic tile design of tree stumps

The outdoor classroom infrastructure will be constructed using reclaimed wood from tree stumps of trees previously cut down. These stumps will be trimmed and sanded down in order to provide a comfortable seat for students and users when engaging with the site. In order to offer a more colorful and inviting space, some of the stumps will be decorated with a mosaic tile design, using discarded and reclaimed tiles from a nearby recuperation center. High school students and interested volunteers will be invited to come to the site and work to create a design on their tree stumps for the use of the outdoor classroom.



This activity was conducted as part of the initiation to the developed infrastructure of the site. Tiles were acquired from a transition movement project that uses all reclaimed materials. Preparation and facilitation of the workshop was conducted by a NaturED member and carried out by a small group of high school students from EEL. Further details of this activity can be found in **Annexe 2**.

2. Outdoor classroom installation

Outdoor learning offers many benefits for teachers and students alike. Providing a natural space to present and teach information about the world around them can become more meaningful in an outdoor classroom. This setting helps to address issues related to biodiversity which can help students connect and better understand its importance to the ecosystems. What's more, outdoor education and natural learning environments have been proven to decrease sedentary behaviors, improve concentration levels and encourage children to be more physically active.

The group proposes to use the existing layout of the plot to further develop the space into a classroom setting. Each section will be transformed to emphasize a particular learning set up; each with different purposes. The overall goal is to create a fully functional outdoor classroom where several different groups can come together simultaneously to use the space for learning.

A series of 3-D images are inserted below to demonstrate the planned transformation of the site and installation of tree stumps for the creation of outdoor classroom formations. Further detailed images can be found in **Annexe 3**.

Space visualization



Figure 1

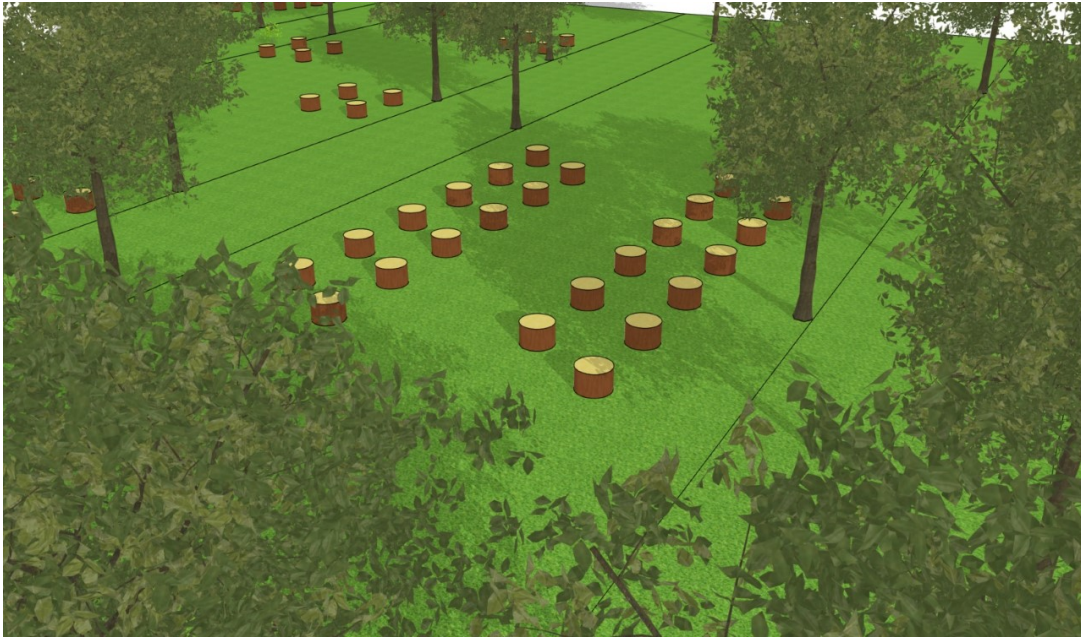


Figure 2

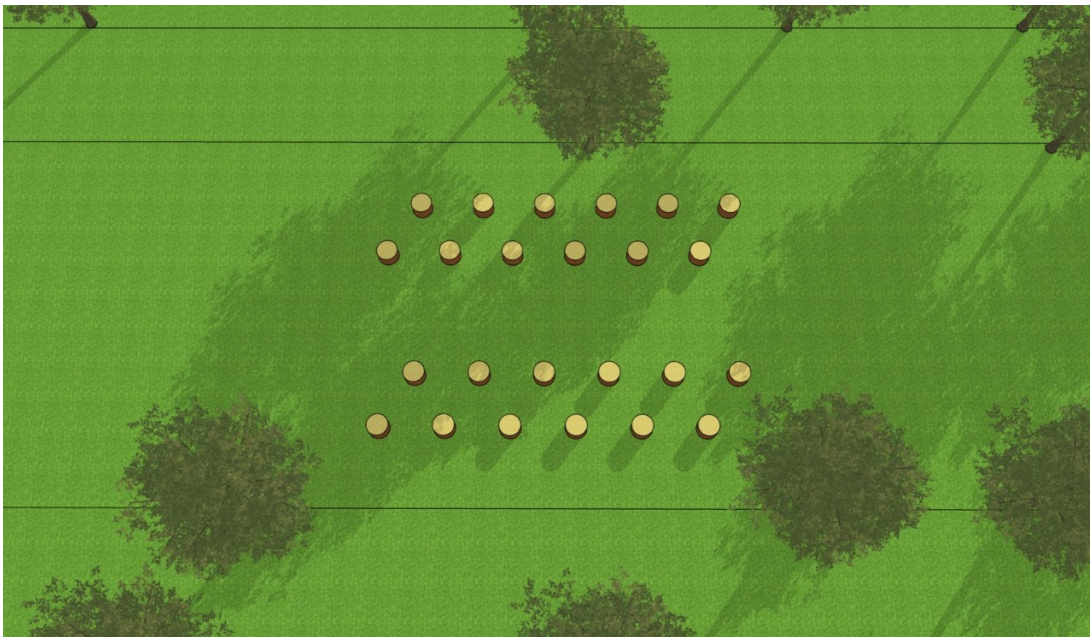


Figure 3

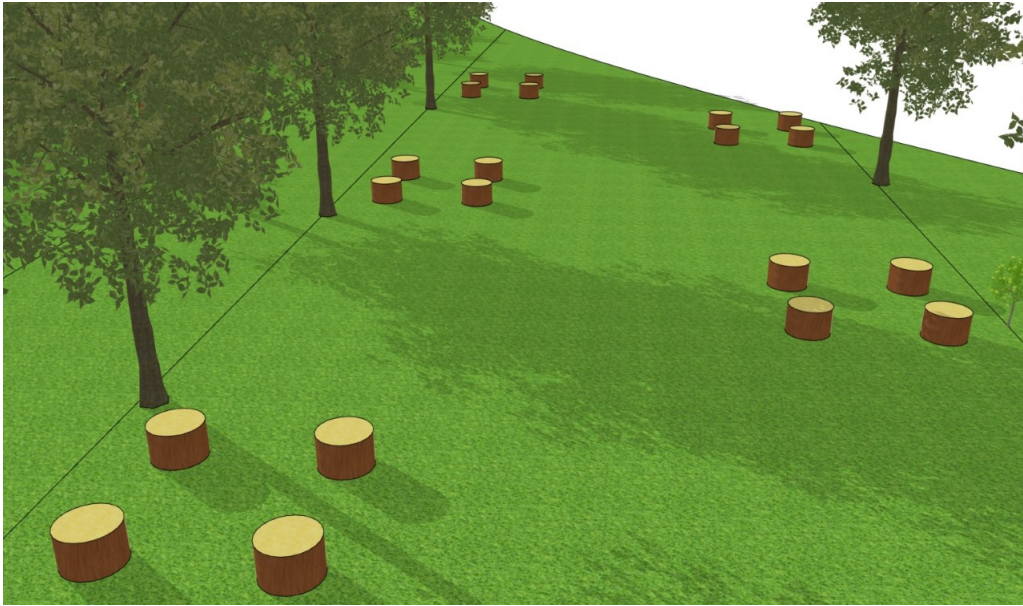


Figure 4

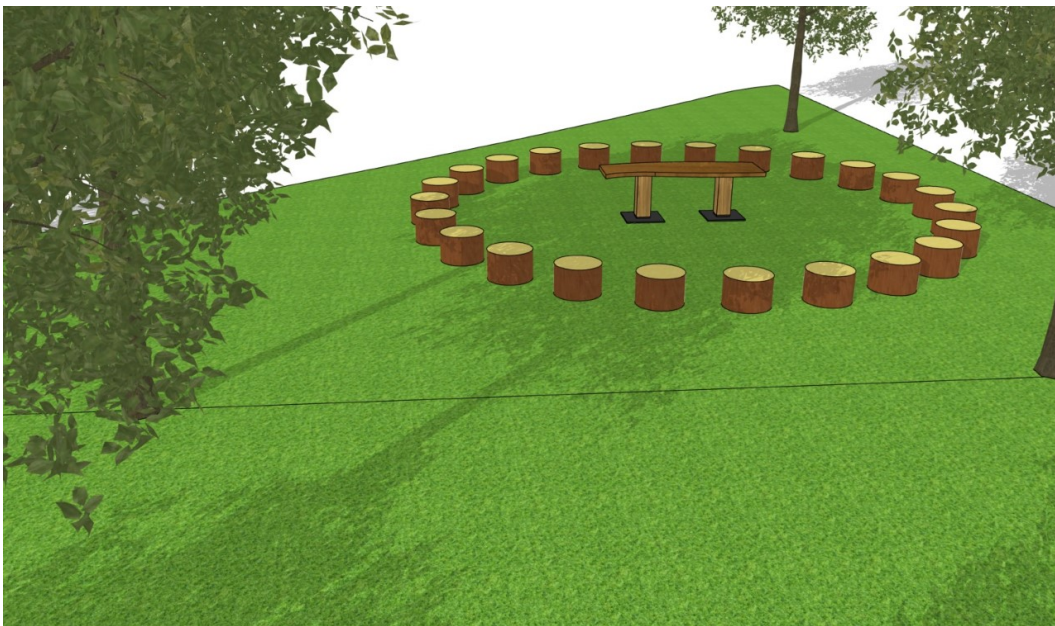


Figure 5

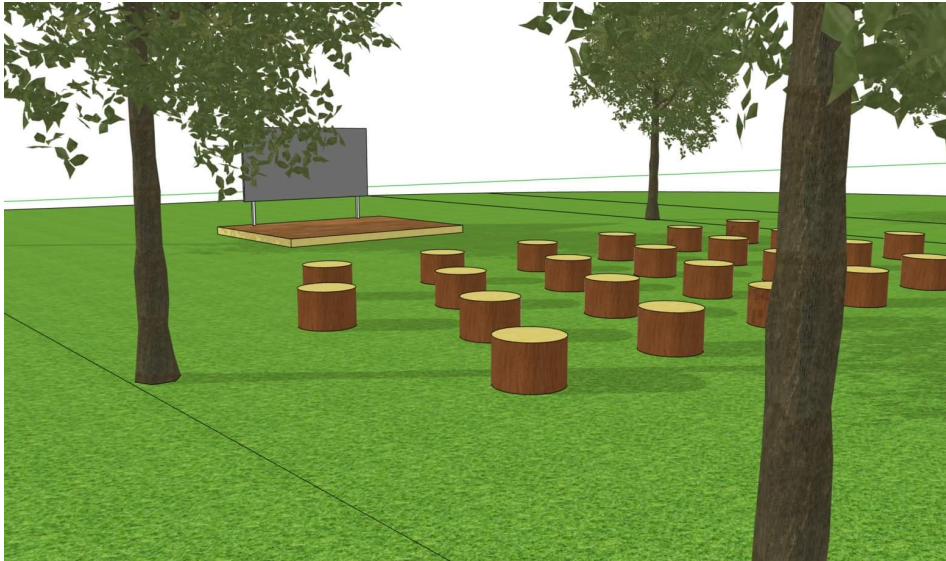
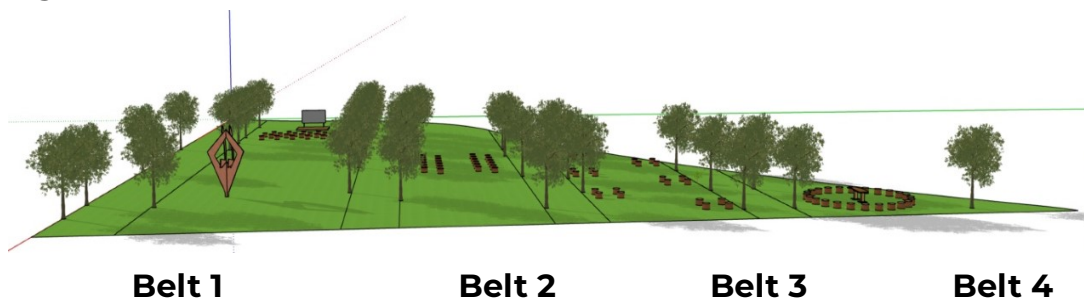


Figure 6



Land Belt #1

This first land belt will be the primary area to receive the classroom infrastructure. *Euro diversity for biodiversity* could be an integrated project with several classes at EEL where students could connect with classmates from other language sections to build a classroom and possibly add to the biodiversity by planting more trees and shrubs.

This space would include several components in order to create the full effect of the outdoor classroom:

- Installing insect hotels, bird houses and other infrastructure to attract pollinators that could be built as part of a classroom activity.
- Installing information panels about the importance of pollinators, lichens as indicators, etc.
- Piles of dead wood scattered throughout the plot strategically placed to enhance certain activities as well as encourage lichen, insects and small mammals.

- Tree stumps would be set up in informal rows with a wooden blackboard with magnetic paint allowing for the teacher to both write and pin up posters in order to facilitate the teaching component of the lesson.



Land Belt #2

This section will include a learning space with tree stumps set up in a “oxford debate” formation. Two parallel rows of stumps facing each other with a space in the middle. This middle section is meant for the student or speaker to present ideas to the two sides of the group. There are also possibilities of grouping the rows based on various opinion survey formations (eg: 0 to 10 of emotional engagement in the topic).



Land Belt #3

This section will be designed to facilitate group work among students. Clusters of tree stumps at different heights will allow for students to gather in small groups of 3 to five for discussion and collaboration. These areas would also work well for workshop stations where experiments and observations of plants, insects and soils through microscopes can be set up.



Land Belt #4

The last section of the plot, with close proximity to the school gates will serve as the first meeting space for the students. Exchanges, teachings and discussion will be easy to access and invite open conversation. The wooden stumps will be arranged in a large circle at a low enough height for students to sit comfortably. The surrounding trees will also provide shade for reprieve on particularly hot days.



3. Didactic tool: Activities and lessons

The developed didactic tools and activities will be published in a form of digital deliverables on the website of Sustainable Development and Social Innovation Certificate, as well as on the website(s) of the partners (e.g. <https://www.fondskirchberg.lu>, <https://luga2023.lu>). Informative panels on the site would have QR codes or website links indicating free access to educational material in order to conduct outdoor activities. These would be divided by age group.

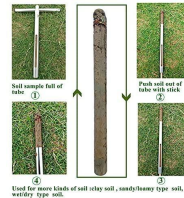
The following activities are suggestions to offer a taste of what kind of engagement could take place between the natural space and the students.

1. Take a deep....dig (primary, secondary, beyond)



Learning objective: Searching for proof of symbiosis between plants and bacteria, analysis of roots, measuring nitrogen levels in the soil. Workshops to take samples of soil to measure the level of nitrogen in different parts of the plot (with legumes plants and without), with the use of Egner stick.

How to take the soil sample:



https://www.youtube.com/watch?v=3_U9Z3fy0lg

Older students can go further in their data collection with the isolation of the Rhizobium bacteria derived from clover roots nodules. This activity could also be incorporated into biology classes where such experiments can be integrated into curriculum outcomes. See the video here:

<https://www.youtube.com/watch?v=lod0VuNbnhE>

2. Who is Luck - y? (kindergarten, primary)



Learning objective: Searching for shapes, colors of clovers and numbers of leaves. Counting species of clovers and observing how and where they grow. Looking for 4-leaf clovers, the symbol of luck and happiness. Discussions around happiness and creating a list of things that make us happy.

3. Can you hear the be (zzz) eees? (kindergarten, primary, secondary)



Learning objectives: Recognizing and identifying species of pollinators and differences between pollinators and non-pollinators. Basic entomology exploration through artistic workshop. Watercolor painting exercise to discover the morphology and anatomy of pollinators.

Older students can work on models of insects using recycled materials. Identifying bees, butterflies, wasps, dragonflies, mosquitos, etc. Using the existing metal statue on the plot, students can build extension models that represent the pollinators that are integral to the biodiversity on site. Further discussions and presentations can take place while describing the anatomy of the insects from the installation. Possibility of this becoming content for future podcasts about pollinators.

Examples/ inspirations:

- Aquarelles/ watercolor painting in the nature, Template Monsters, Doodlewash
- Insects models: <https://owadogigant.pl/atrakcje/>

- <https://www.pxfuel.com/en/free-photo-owqxq>
<https://owadogigant.pl/atraccje/>

4. Can You taste the “V” ? (primary, secondary, university)



Learning objectives: Learning about fruits and vegetables that contain many important vitamins for our health. Macro and micro elements can be detected using edible plants and iodine. Vitamin C in different fruits and vegetables can be determined. Raspberries, black and red currant, plums can be found on the plot.

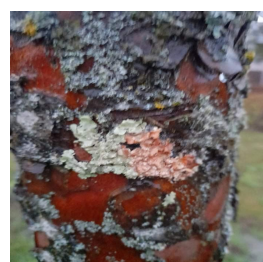
See the instruction and experiment here:

<https://www.youtube.com/watch?v=fHCcf6ZH4LQ>

For university level: read more here:

<https://www.thoughtco.com/vitamin-c-determination-by-iodine-titration-606322>

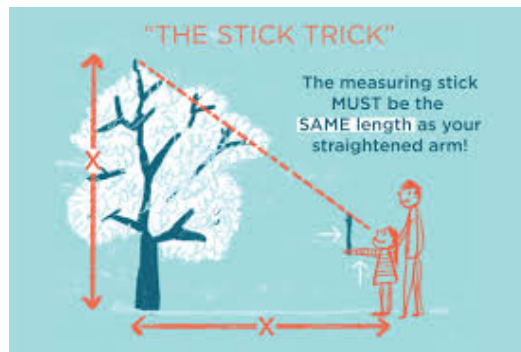
5. Take a deep breath! (primary, secondary)



Learning objectives: Learning about the lichens and their meaning as bioindicators for air pollution in the city. Teachers begin with descriptions of various types of lichens. Students spend time searching and detecting different species on the plot. Data is collected on quantity, characteristics and scale of growth. Students will work to develop a map of the park demonstrating the occurrences of lichens and its correlation to air

pollution. Discoveries can be discussed in groups where students gain an understanding of how air pollution changes based on proximity to main roads, rock walls, parking lots, etc.

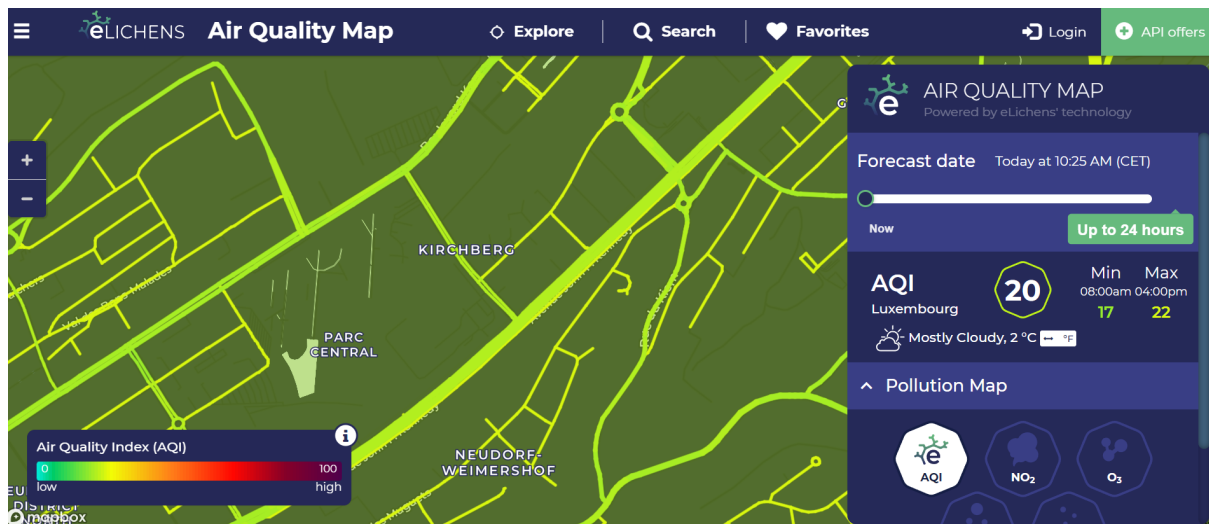
6. Learning about trees (primary, secondary)



Learning objective: Students learn about the species of trees that are found on the site. Each different species has different characteristics and students can determine the age and height of a particular tree on the plot with simple activities using a pencil, measuring tape and mathematical equations. Students are grouped into pairs and take turns measuring the height of a tree using a pencil and their partners distance from the tree. The age of the tree can also be determined by measuring the diameter of a tree and applying a mathematical equation based on the current year and the species of a tree.

<https://www.treehugger.com/estimating-forest-trees-age-1343321>

7. Setting up the public research through citizen science (secondary, university, citizens)



Learning objective: Students use existing citizen science tools to collect data and develop a digital map of the lichens discovered on the plot. Information collected from lichens as a bioindicator of air pollution can contribute to Luxembourg current CO₂ levels and compared to nearby areas.

<https://map.elichens.com/#/@49.62683405390277,6.164664576929795,z14.361718260594245>

PART IV: IMPLEMENTATION PLAN

The implementation of our project requires a step-by-step process that includes testing the target audience, consultations with experts and coordination of efforts, materials and volunteers. Since the educational concept is a focal point of the project, an initial testing of the activities will take place on the site in its current state. Following evaluation and feedback from this, modifications can be made to the proposed tools and set up of the space.

Next, the group will need to secure buy-in from the various stakeholders of the project. Securing funding, permissions and designs for the plantings will be earned through a series of meetings with relevant parties. Once the design of the space has been finalized, the group will be able to determine the incremental steps required to carry out the transformation of the space. Planning of volunteer events to encourage community involvement in the transformation will follow.

Finally, the pedagogical material and didactic tools will continue to be developed and uploaded to a digital site for a launch for teachers and educators looking to conduct the activities provided for the plot.

Pilot educational activities with Uni Students

Certain activities suggested in the didactic tool kit have been piloted as part of the project proposal. University students from the *Certificate in Sustainable Development and Social Innovation* were invited to participate in a test of certain learning activities. The goal was to test the effectiveness and impact of the activities. Lichen observations, understanding pollinators and importance of biodiversity were integrated into pilot lessons taken place on the site. Further details on this activity can be found in **Annexe 4**.

Details on how these activities could use a citizen science tool and might be adapted to the setup of the outdoor classroom infrastructure were discussed by the members of NaturED.

Confirm Stakeholder engagement

Funding and permissions

Fonds Kirchberg: Based on results from pilot project and design ideas, the project is to be pitched to establish commitment from this important group. This included discussions and dialogue to determine level of engagement from the organization, timeline, possibilities for funding, promotion and authorization for the transformation of the space. If fundraising is required, the group will need to establish a plan to solicit funds from nearby companies and residents.

Call on the Experts

Thierry Helminger and the museum: A meeting with Thierry was held to pitch the project and discuss the best course of action for the transformation while ensuring that the arboretum is protected and maintained. The group determined willingness to engage with educational components through presentations and materials and to introduce students to the subject of biodiversity and its importance. Further discussions around the installation of classroom materials with the help of students and volunteers through facilitated events. Possibility of acquiring planting materials and tools. Determine if connections through the museum would be possible for this.

Further details on this meeting can be found in **Annexe 5**.

St. George's School - Outdoor classroom: Other communities in Luxembourg that have successfully built an outdoor classroom were identified and interviewed in order to gain understanding and insight. Discussions on how and where to source materials, maintain weatherproofing of the infrastructure as well as logistics around teacher engagement with the space were fruitful.

Further details on this meeting can be found in **Annexe 5**.

Student Engagement

European School: Reach out to instructors and establish commitment to participate in adapted didactic activities on the site as well as the planting event. Determine a set of engagement activities from presentations at the school to introduce the subject of biodiversity, why it's important and the

vision of the plot to help with the current situation of biodiversity loss. Any required permissions for students to come to the plot, make a schedule with the teacher on the best time to carry out the activities.

Plan the delivery and installation of materials

Establish materials and sources for the outdoor classroom infrastructure. Schedule delivery of materials and coordinate with members and volunteers to help with set up on site. Determine necessary set up preparations and installation requirements to ensure longevity of the tree stumps placed on the site.

For further details on the delivery schedule and plan see **Annexe 6**.

Expand and promote

The didactic tools would be flushed out to include proper lesson plans, materials and discussion points. Each activity would follow an easy-to-use format allowing for educators of all sorts to integrate into their teachings. These lessons would include descriptions of learning outcomes and relevance to school syllabus based on age group. Depending on funding and availability, information panels would be installed on the site to include details about the site, the biodiversity and the pollinators. Suggested activities would be available on the university website or other platform which users could access via QR code or weblink.

Use the **University of Luxembourg** resource repository to promote the program, evaluate the successes and offer critique. The project description will be uploaded along with the didactic toolkit. The goal will be to allow open access to the details of the project and resources for learning thus allowing propagation for future outdoor classrooms and learning activities on biodiversity. This open access database of educational activities will allow teachers to access the activities specific to the space or use their own and then add them to the site to expand the program. This will ultimately achieve the overall goals of the project, that is to increase biodiversity understanding and a deeper connection to nature through well-being and experiential learning activities.

Please visit the project website to see further details from the program.

Annexe 1: Engaging students in building insect hotel

Student Account of engagement in insect hotel construction:

“This was my first ever internship experience, and quite frankly I found it really interesting, and I would really like to study urban management or development in the future, therefore I think this was a great internship in link to this field of work. Mrs. Rodzinka and I both went to the plot and looked at different insects and plants that could be found at the plot, then we did some research, came up with a plan and design for how to maintain or even increase the biodiversity during the rapid urbanization of Luxembourg, and then, lastly, I had to actually put this into practice, similarly as to any other project, of course I know there is a lot more paperwork, etc.,but I think it was a great experience to give me the feeling of how projects come to reality. In the end, I know my insect hotel might not be the best looking, but I am really happy with how it turned out, and that I managed to use recycled materials, and, overall, I really enjoyed working with Mrs.Rodzinka, and I hope that we inspire more people to do this.

The first day, Mrs.Rodzinka and I met in her classroom and without wasting much time we got straight to work. My first task was to write an article about insect hotels and biodiversity in Luxembourg for the website. After I had completed the first task, I was ready to make my own design for an insect hotel and figure out what materials to use (I was thinking of using some wooden pallets, so we recycled ones from the school)



I even used the wooden parts that you see in the picture in the middle for creating legs on the hotel, so that it would be more stable. When I had finalized the design, I got to work, with some learning curves, but in the end, I made my first ever real prototype of a bug hotel using the natural materials that come from the site or around the plot. Lastly, my final task was to go to the site, unfortunately without Mrs.Rodzinka, because she was ill, to set up the prototype at the site. In my opinion, I think this was a great learning experience, not only was this my first time building a bug hotel, but it was my first time working on a real project, and it makes me feel proud that every time I walk past the park now, I will be able to say

that I participated in this project and contributed to the increasing of biodiversity in Luxembourg, in addition, I can also proudly say I built the bug hotel myself.



During this internship I obtained several new skills, firstly, I learned how to put my knowledge into practice, because I spent quite some time researching how to build an insect hotel (I had never done it before) and what materials to use for the hotel, and what type of design I am going to go with, then I also learned how to work with my hands, I gained more experience working with tools (such as saws, drill, and staple guns). Lastly, during this internship I realized how important good communication is in a workplace, I learned how important it was to communicate with my boss (Mrs. Rodzinka) via phone, email, or SMS if I have any questions or if I do not know how to work on a task. Asking for help and clarification is better than pretending you have understood what you need to do, no matter what. The only thing that I wished for more was that I expected to work more as a team and do the work collectively, but it was still a wonderful experience.

90% of wild flowering plants need pollinators, therefore these insect hotels will provide a home for several types of pollinators, which will enhance biodiversity in Luxembourg. Insect hotels are a wonderful addition to any garden, park, or outdoor space! They provide a home for insects and in return the insects will increase biodiversity, pollinate plants, and help with pests. In conclusion, I hope that my insect hotel is appealing enough for the insects, and I really hope that my contribution does make a change, and that the project NaturED is a complete success, and that we manage to help inform and change the way people live, and try to live more environmentally sustainable, and I am really grateful for the opportunity to contribute and participate in this project. Thank you,"

- Ralfs, student of s6, European School of Kirchberg

Pictures from the Kirchberg plot in Park Centrale after the installation of bug hotel made by Ralfs Lutovs.

Annexe 2: Engaging students in mosaic tiles on tree stumps

With the intention to make the outdoor classrooms an inviting and inspiring space for student and citizen engagement, the group proposes to engage students and volunteer to decorate the tree stumps on site with mosaic tile design. With the guidance of a NaturED member, students can work collaboratively to create a beautiful and colorful environment, which can also inculcate a sense of care for the outdoor classroom.



Required Materials:

The tiles for this craft exercise are acquired from a transition movement project that uses all reclaimed materials. The other tools required for this are-

- Hammer
- Tile snipper (optional)
- Adhesive fibreglass mesh (optional)
- Adhesive
- Sand grout
- Trowel
- Some gloves
- Sponges
- Dusting cloth (optional)

Exercise details:

1. The tiles must be broken by hammer by placing it on a hard leveled surface and putting a piece of old cloth or tissue on top, to avoid pieces of tile from splashing and hurting someone. This must be best done by the teacher or mentor.
2. Place the pieces on the tree stump surface as per design and now use a trowel to add a layer of adhesive on the base surface. Place it firmly on the surface of logs for it to stick well to the log top.

3. Leave the pattern overnight to dry and cure.
4. Now use a sand premixed grout to fill in the spaces between the tiles. Spread it well with a sponge, so that it creeps in all the joints properly and let it sit for 15minutes.
5. Now clean the surface with a semi wet sponge.

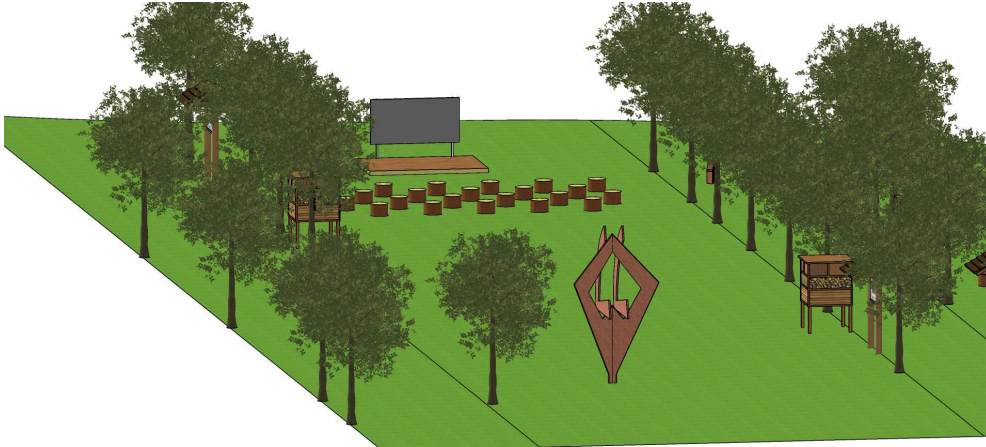
This workshop can be associated with different didactic lesson plans to develop themes for the craft project and act as an additional arm to the lesson plans as well.

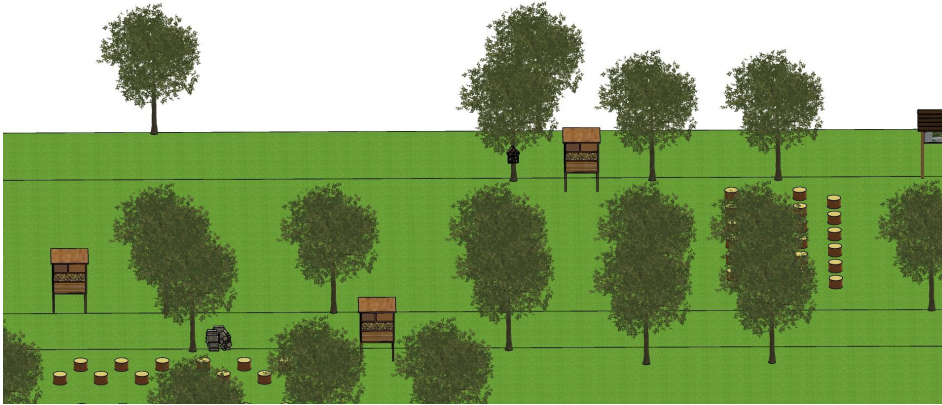
Refer to –

<https://www.bhg.com/decorating/do-it-yourself/quick-and-easy-projects/how-to-mosaic/>

And watch a video demonstrating the workshop -
<https://www.youtube.com/watch?v=FAyx1bSW1Pg>

Annexe 3: Further 3D diagrams of plot design





Annexe 4: Pilot educational activities with Uni Students

On 06.07.2020 students in the Certificate of Sustainable Development and Social Innovation were invited to participate in a pilot activity on the plot in order to assess the effectiveness and engagement of proposed didactic tools. Lessons centered around information and theory on the importance of pollinators, how and where they live, why they benefit biodiversity and how we can engage with them in a positive way. The following lesson plan describe the activities conducted along with necessary reference information that has been formatted for future use by other educators.

Lesson title: “Can You hear the b zzzzz” Can You smell the trees?”

Learning Outcomes:

Understanding pollinators strategies

- To distinguish between pollinators and non-pollinators
- To be able to point out species responsible for pollination
- To be able to list the adaptation to pollination
- To know the meaning of pollinators for environment
- To be able to recognize some plants pollinate by bees
- To taste some of the bees products 😊
- To know what plant species can increase the number of pollinators in Your own garden

Plant strategies:

- To be able to point out plants strategies to attract pollinators (shape, color, smell, pollen and nectar)
- To be able to design small garden bed (flowers or vegetables or mixed) suitable for different species of pollinators

Well being:

- To develop creativeness and spatial design skills
- To experience nature
- To learn how to collaborate
- To investigate different features of land plot
- To develop artistic skills
- To simply play with nature

Required Materials:

- *Cartoons or models with different species of pollinators*
- *Soaps with different natural plant parfums*
- *Seeds or plant of lavender*

- Honey and spatules or spoons to taste honey plus jar / lid
- Flowers – different shapes, smell, color – (if no flowers on site)
- Fruits and vegetables (onions, cucumbers, carrots, sunflowers, strawberries....) plus shopping bags, fruits , bread and blankets
- Magnifying glass plus the natural specimen (bee, bumblebee or butterfly to see the anatomy)- if not possible little videos with QR code available on the project website
- Papers to write down the conclusion from group work discussion
- Pastel crayons and blocs

Introduction of the subject and group discussion:

Divide into smaller groups and start with small discussion groups and brainstorming posters. (belt no. 2)

a)why do we need biodiversity?

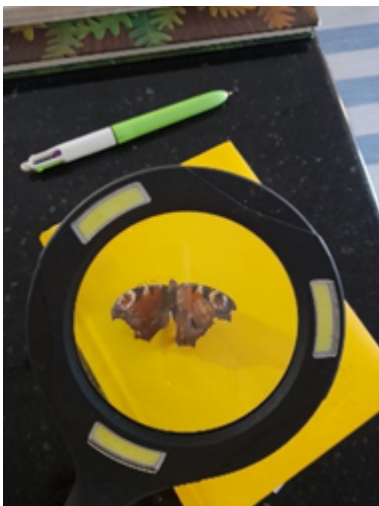
b)how many species can You see in this plot of land?

c)what are the roles of those species?

Follow with larger group discussion and exchange of ideas:

Point out the group of organism which will be the major point of todays lesson – POLLINATORS- congratulation for the group which had pollinators on its list (belt.no 4)

*give the winning group - little plant which attracts bees or any other gadget (like soap, honey jar etc.)



Research and Understanding:

Present information to students about pollinators, their importance and how they work by integrating these activities.

1) Organisms responsible for pollination: (use models or pictures of different species)

- Beetles –like ladybird: <https://www.youtube.com/watch?v=b-ykzxhJs4M>
- Butterflies including moths like the hawk moth or sphinx moth: <https://www.youtube.com/watch?v=puTy8flcQMY>
- Hummingbirds
- Bats : <https://www.youtube.com/watch?v=clvXhAXRIfc>
- Flies : <https://www.youtube.com/watch?v=oE4VpGoXlwE>
- Bumblebees, Bees and Wasps: (explain the role of wasps when there is no bees)

2) The parts of a flower

Students search for a flower on site to use as a natural specimen found. An analysis of the various parts of a flower and how pollination is termed.

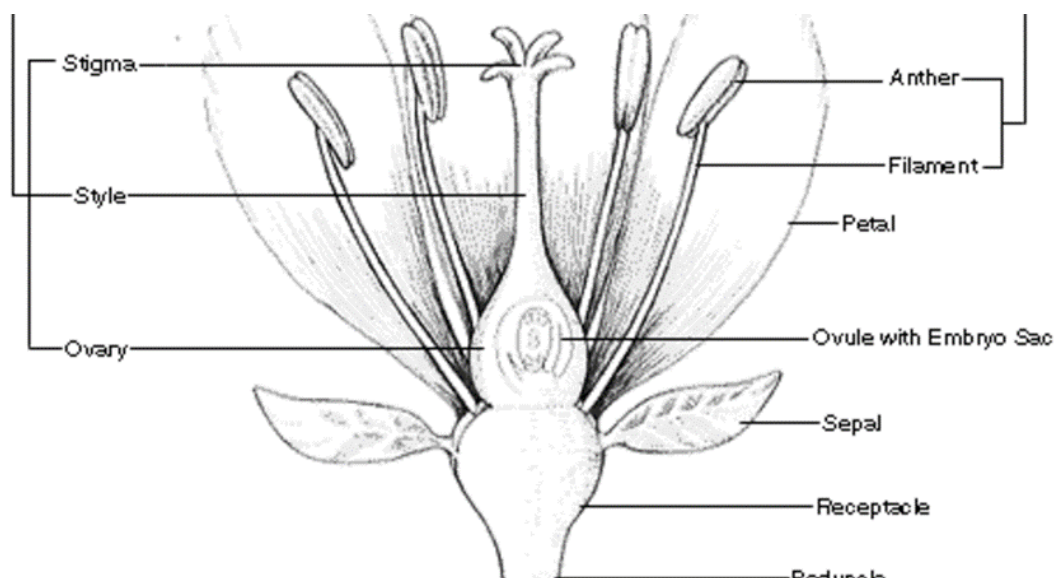
Students are invited to draw a picture of their specimen with pastels crayons and identify/ label particular parts of flower.

Picture from American Museum of Natural History

More here:

<https://www.amnh.org/learn-teach/curriculum-collections/biodiversity-counts/plant-identification/plant-morphology/parts-of-a-flower>

Students pictures can be hung throughout the classroom in the form of a small art exhibit.

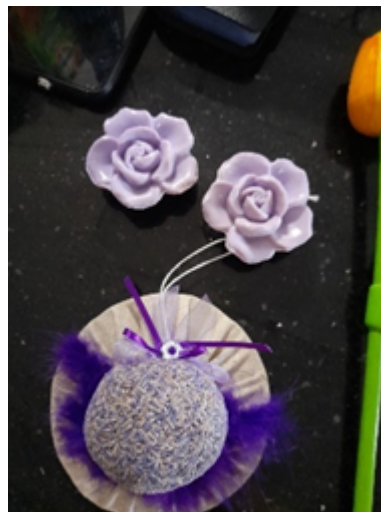
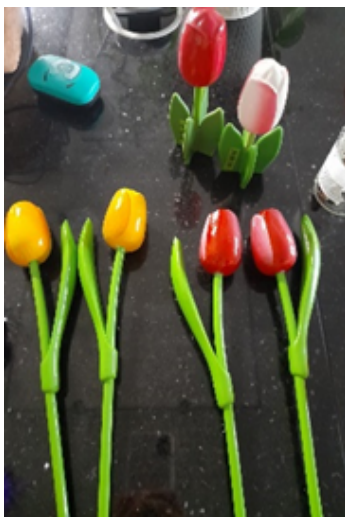


3) Strategies to attract pollinators

Students are invited to participate in a short role play game in order to better understand strategies used by pollinators. Boys and girls are assigned roles as different flowers and bees. Flowers are selected based on smell color or specific nectar. The anatomy of the flower and the pollinator are correlated for what fits best. Teacher can emphasize different flowers teach about differences and commonalities, to emphasize that bees can not recognize red color – only yellow, white, blue and ...black and ultraviolet (UV)

This activity can be extended by having students search different types of flowers based on these criteria. For example, strong perfume for bees, similar colors, or varied shapes and nectar pockets.

Students could also work to set up traps for pollinators in order to better observe their behavior, such as lavender seeds and honey.



Design of garden beds:

Teacher presents items that are pollinated by bees: lemons, cucumbers, beetroots, cherries, strawberries, peppers, sunflowers, pumpkins, leek and onions.

Discussion around how to design a garden bed for pollination and harvest of vegetables. Students are invited to design their own garden beds for gardens or balconies. Discussions can continue around other plants pollinated by other species (beetles, bumblebees etc.) in the net resources or on the site. Students can search the site for pollinators and plants and take pictures to add to their design.

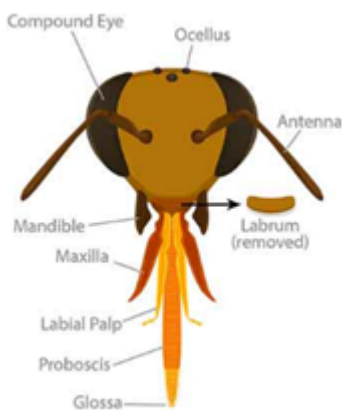
At the end of the topic about strategies of plants to attract pollinators teacher can ask groups to watch this video about the biggest flower in the

world and at the same time with the worst smell - Rafflesia and its pollinators : flies

<https://www.youtube.com/watch?v=YxIpl38rsMo>



4) The anatomy of a pollinators



(from *Wiscosin Pollinators*)

Teacher demonstrates with a cartoon or natural specimen to observe, describing the parts of the specimen: antenna , glossa, probioscis , compound eyes. Legs have the same basic parts as other insect legs. Beginning with the part closest to the bee's body, they are the coxa, trochanter, femur, tibia and tarsus. These parts act basically like the bee's hip, thigh, shin and foot, and tiny joints separate each segment.

A bee's legs can also have several specialized structures, including:

- Brush-, comb- and basket-like hairs for collecting pollen
- A pad and claw for holding and manipulating objects
- A small groove for removing pollen from the antenna
- A press for packing pollen

Show video of bumblebee feeding <https://fb.watch/dsIqJjkkOr/>

Conclusion:

Serve honey with bread and fruit as a snack while discussing the healing properties of honey. Students can create a poster about chosen honey and its properties with the use of internet resources.



Annexe 5: Call on the Experts

In order to gain a better understanding of the project site and the challenge of the transformation, interviews were conducted with experts. The following is a summary of discussions, insights and recommendations to ensure the success of the project implementation.

Expert: Thierry Helminger: Curator for the Arboretum at project site, Musee de la Nature

Date: 05.04.2022

Thierry Helminger was instrumental in decisions made for the plot design and activity focus. Because of his connections with the Arboretum and the current state of the site, we were able to better understand how the site is maintained and what transformation would be possible.

Upon his recommendation, it was decided that the existing biodiversity could provide an already established laboratory for learning and that new plantings were perhaps not necessary. We determined that using each section of the plot for a different classroom set up would be possible but that we would need to take into account the existing art statues on the site and the meadows of wildflowers that were previously not visible in our original design phase.

M. Helminger provided a list and map of current species on the site which will be helpful for the further development of the didactic tools and information panels. We discussed the possibility of filling the gaps where trees have died and how to improve the planting sites. His recommendation was to maintain the focus of the project on the educational infrastructure as this is more needed for the community.

Further discussions on the importance of insect hotels, log piles and information panels were held; where emphasis was placed on creating habitats for much needed insects. Wildflower planting would also be an easy school project in order to encourage more pollinators to the site, but M. Helminger pointed out that flower meadows were already abundant on the site and so any additions would be more for educational purposes.

Concerns about possible vandalization of the installations were also raised. The group discussed how the tree stumps could be installed in order to prevent any theft or destruction of the formation of the logs. Further exploration of these techniques were then researched in order to ensure that if adopted they remain invasive to the landscape and existing biodiversity.

Exchanges on sources for materials, specifically the logs were very useful and contact information for possible providers were given. In terms of educational opportunities, we learned about the iNaturalist events being

held in Luxembourg, citizen science opportunities and the City Nature challenge. These types of activities would be excellent opportunities to promote the project and engage with the local community.

**Expert: Annie McHugh : Sustainability coordinator at St Georges School
Date: 18.05.2022**

Presentation of the outdoor classroom:

- Tree stumps are set up in a classic row cluster, approximately 20 cm from the ground
- Stumps have been sanded down to prevent splinters and a small mat of waterproof material was placed on top due to the volume of sap that was excreting from the stumps and making it sticky
- Annie described how she obtained the stumps: she attempted to contact many people from ANF but was unable to secure any stumps. She received a few contact names and has forwarded them to the group
- Eventually, she decided to cut down a tree from her own lot. The tree was an invasive species that had been brought from abroad and needed to come down, so she decided to cut it to use as stumps for the classroom. She planted three new trees in its stead.
- The stumps have been placed on the grass in formation and are not being held down with anything. They are quite heavy to lift and move around. So far they have not had any issues with the displacement of them.
- There are two benches at the front of the classroom that were installed and used a metal rod into the ground under each leg of the benches to secure them into the ground.
- The chalkboard was created with reclaimed wood from an old century wood. The board was painted with black chalk paint. It is easier maintenance and more weather resistant
- Annie mentioned the importance of having supplies ready and available for the teachers in order to make it as easy as possible for them to learn. Such as chalk, erasers, extra school supplies for the students, etc. These are available in a shed next to the classroom set up
- There is an online system that allows the teachers to reserve the space for their class
- We showed our design plan to Annie and discussed the importance of having trees for shade around the classroom formation. With the intense heat of today, it was evident that this is imperative

- We need to check on the sun path of our plot to get an idea of where the most shade is for the set up. Magdalena said she would check the site to see how it has grown in, what kind of shade is there and the sun path.

Secondary outdoor classroom proposal:

- Annie is now working on setting up a similar style of classroom for the secondary section of the school, but there are many more obstacles here.
- She is exploring how the natural materials could be made to create a table and seat style of classroom for this level.
- We explore options of using old tires to create the table top
- She mentioned there is resistance from the secondary section because of the curriculum demands and teachers insisting on focusing on this instead of outdoor ed.
- Her idea is to integrate the use of the classroom into the wellness classes and to develop 3 lessons that are specific for sustainability for secondary, but involve being in the outdoor classroom. Biodiversity and connecting with nature, wellness and health, community action and global change

Visit of the gardens:

- Didactic ideas for learning, insect hotels, identifying species, sunflower growing contest, growing fruit and vegetables, compost
- Educational games to be played by the primary outside by understanding the biodiversity on the school grounds
- Insect hotels were placed low to the ground and areas were filled with nest of burrowing bees, etc.
- Annie described the simple design of using wooden crates cut into fours and then piled on top of one another with other wood pieces laid in between. We discussed the importance of them being low to the ground
- We were impressed with the simple design that did not involve carpentry work and could be set up easily using basic materials
- It was important that the insect hotels be set up far enough away from major traffic of the students. To avoid any damage from students as well as to not disturb the nests.

Annexe 6: Delivery plan for infrastructure materials

The next phase of the project is the implementation of outdoor classroom setup. Refer to the design from the Annex 3 to form the basis of the installation process ahead. In the beginning, pick a design belt out of the 4 belts, and improvise the design if required, on the basis of

- Appropriate accessibility from the adjoining roads.
- An engaging classroom set-up.
- Site with grassy land-cover
- Appropriate shading for comfort

Installation Process-

After obtaining the required approvals from Fonds Kirchberg, material selection and sourcing need to begin. One may follow the following process for the same-

1. Sourcing- The cut wood logs that may be sourced from the forest guard of Luxembourg district or equivalent authority. Contact and set up a delivery date for the same. Preferably source upto 20 logs, in the beginning to ensure ease of handling.

Note: At the time of delivery some members of NaturED group and volunteers shall be present to ensure comfortable handling of the logs.

2. Delivery- The biggest challenge here is the place of delivery and short-term storage of the acquired logs. The logs need to be delivered at a location close to the site, so that it can be transferred hassle-free to the identified site belt. The preferable location of the place of delivery may be the site itself, after acquiring the necessary approval from FK (maybe delivered close to the date of installation).
3. Preparation of logs- To ensure longevity of the wooden logs, volunteers may work the wood for weather-proofing.

Required materials-

- Sand-paper
- Sponge or pieces of thick absorbing cloth
- Any vegetable oil
- Gloves

Process-

- The wood log needs to be sanded lightly to remove any excess dirt or loose pieces of bark.

- Additionally, sand the top of the log to prepare it for decoration with mosaic tile. (refer to Annexe 2)
- Next, take a sponge or a thick cotton cloth and dip it in oil. Rub the surfaces with it to let the wood absorb the oil.
- Leave the woods for a couple of hours before installing.

4. Installation-

- Mark the position of the wood log seats on the identified site, as per the design using some stones.
- Using a shovel, till the soil lightly to soften the base and for removing any excess vegetation.
- Now, sand the base of the logs slightly and with the help of other volunteers, gently place the logs on the prepared base. *Note: use gloves and wear clothes that may cover ones arms, to avoid any injury.*

Note: The decoration of the top of logs using mosaic tile can be done during or post installation of logs, with student groups or volunteering citizens. (refer to Annexe 2)

Additionally, in the future, sourcing of repurposed wood to make signages and blackboards must be added to the project, as work progresses.

Annexe 7: Current species list of site

The Rosaceum in the Central Park of the Arboretum houses 48 taxa with 29 different species belonging to the rose family (Rosaceae), which in turn belong to different genera of ornamental (fruit) trees. The different varieties (apple, pear, cherry, rowan, and almond) were chosen for their abundant flowers, fruits, leaves and colours to create a colourful garden all year round.

The Rosaceum contains following species (This list was made based on Thierry Helminger's data):

	Name:	Common Names:
1	<i>Crataegus laevigata</i> cv. Paul's Scarlett	Roude Wäissdar; Rotdorn; Aubépine rouge; Red Hawthorn
2	<i>Crataegus monogyna</i> cv. Stricta	Wäissdar 'Stricta'; Eingrifflicher Weißdorn 'Stricta'; Aubépine à un style 'Stricta'; Hawthorn 'Stricta'
3	<i>Crataegus x mordensis</i> Boom cv. Toba	
4	<i>Crataegus x persimilis</i> cv. Splendens	Prommebliedregen Wäissdar 'Splendens'; Pflaumenblättriger Weißdorn 'Splendens'; Épine hybride à feuilles de prunier 'Splendens'; Prune-leaved Hawthorn 'Splendens'
5	<i>Pyrus nivalis</i> Jacq.	Schneebirne; Lederbirne
6	<i>Sorbus</i>	
7	<i>Sorbus vilmorinii</i> Schneid.	
8	<i>Sorbus x arnoldiana</i> cv. Golden Wonder	Arnolds-Vullekiischtebam 'Golden Wonder'; Arnolds Eberesche 'Golden Wonder'; Sorbier d'Arnold 'Golden Wonder'; Arnolds mountain ash 'Golden Wonder'
9	<i>Mespilus germanica</i> L.	Honnsarsch; Mispel; Néflier; Medlar
10	<i>Malus</i>	
11	<i>Malus pumila</i> Mill. (Rosybloom Group) cv. Makamik	
12	<i>Malus toringo</i> (Sieb.) Sieb. ex de Vriese	Toringo-Apfel
13	<i>Malus floribunda</i> Sieb. ex Van Houtte	Vielblütiger Apfel
14	<i>Malus</i> cv. Gorgeous	
15	<i>Malus</i> (Rosybloom Group) cv. Royalty	
16	<i>Malus</i> cv. John Downie	
17	<i>Malus</i> cv. 'Hillieri'	

18	<i>Malus pumila</i> Mill. (Rosybloom Group) cv. Makamik	
19	<i>Malus</i> cv. Professor Sprenger	
20	<i>Malus</i> cv. Evereste	
21	<i>Malus</i> (Purpurea Group) cv. Eleyi	
22	<i>Malus</i> (Purpurea Group) cv. Aldenhamensis	
23	<i>Malus</i> (Purpurea Group) cv. Aldenhamensis	
24	<i>Malus</i> cv. Van Eseltine	
25	<i>Malus</i> cv. Liset	
26	<i>Malus</i> cv. Profusion	
27	<i>Crataegus monogyna</i> cv. Stricta	Wäissdar 'Stricta'; Eingrifflicher Weißdorn 'Stricta'; Aubépine à un style 'Stricta'; Hawthorn 'Stricta'
28	<i>Crataegus x lavallei</i> cv. Carrierei	
29	<i>Crataegus x persimilis</i> Sarg.	Prommebliedregen Weissdar; Pflaumenblättriger Weißdorn; Épine hybride à feuilles de prunier; Prune-leaved Hawthorn
30	<i>Crataegus laevigata</i> cv. Plena	Waisssdar 'Plena'; Zweigrifflicher Weißdorn 'Plena'; Aubépine à deux styles 'Plena'; European Hawthorn 'Plena'
31	<i>Amelanchier lamarckii</i> Schroder	Amerikanesch Leebiiirchen; Kupfer-Felsenbirne; Amelanchier d'Amerique; Juneberry
32	<i>Amelanchier laevis</i> cv. Ballerina	-; Kahle Felsenbirne 'Ballerina'; -; -
33	<i>Amelanchier lamarckii</i> Schroder	Amerikanesch Leebiiirchen; Kupfer-Felsenbirne; Amelanchier d'Amerique; Juneberry
34	<i>Amelanchier arborea</i> cv. Robin Hill	
35	<i>Amelanchier laevis</i> Wiegand	Kahle Felsenbirne; Allegheny-Felsenbirne
36	<i>Pyrus communis</i> L. cv. Beech Hill	
37	<i>Pyrus caucasica</i> Fed.	
38	<i>Sorbus hybrida</i> cv. Gibbsii	Finnesche Vullekiischtebam 'Gibbsii'; Finnland-Mehlbeere 'Gibbsii'; Alisier de Lapponie 'Gibbsii'; Oak-leaf mountain ash 'Gibbsii'
39	<i>Sorbus x arnoldiana</i> cv. Golden Wonder	Arnolds-Vullekiischtebam 'Golden Wonder'; Arnolds Eberesche 'Golden Wonder'; Sorbier d'Arnold 'Golden Wonder'; Arnolds mountain ash 'Golden Wonder'
40	<i>Sorbus hybrida</i> L.	Finnesche Vullekiischtebam; Bastard-Mehlbeere; Alisier de Laponie; Sorbier finlandais; Oak-leaf Mountain Ash
41	<i>Sorbus x thuringiaca</i> cv. Fastigiata	Thüringische Mehlbeere 'Fastigiata'

42	<i>Sorbus latifolia</i> (Lam.) Pers.	/; Breitblättrige Mehlsbeere; Breitblättrige Eberesche; Alisier de Fontainebleu; /
43	<i>Sorbus hybrida</i> L.	Finnesche Vullekiischtebam; Bastard-Mehlsbeere; Alisier de Laponie; Sorbier finlandais; Oak-leaf Mountain Ash
44	<i>Sorbus intermedia</i> (Ehrh.) Pers.	-; Oxelbeere; Alisier de Suède; Swedish Mountain Ash
45	<i>Sorbus aria</i> cv. Magnifica	Arlesbam 'Magnifica'; Mehlsbeere 'Magnifica'; Alisier blanc 'Magnifica'; Whitebeam 'Magnifica'
46	<i>Sorbus aria</i> cv. Lutescens	Arlesbam 'Lutescens'; Mehlsbeere 'Lutescens'; Alisier blanc 'Lutescens'; Whitebeam 'Lutescens'
47	<i>Prunus avium</i> (L.) L. cv. Plena	Vullekiischtebam; Vogelkirsche; Mérisier des oiseaux; Sweet Cherry
48	<i>Prunus avium</i> L.	Vullekiischtebam; Süß-Kirsche; Mérisier des oiseaux; Sweet Cherry
49	<i>Prunus padus</i> L.	Faulbam; Trauben-Kirsche; Bois puant; Bird Cherry
50	<i>Pyrus</i>	
51	<i>Prunus padus</i> cv. Watereri	Faulbam 'Watereri'; Trauben-Kirsche 'Watereri'; Bois puant 'Watereri'; Bird Cherry 'Watereri'