



REGREEN
NATURE-BASED SOLUTIONS

Fostering nature-based solutions for smart, green and healthy urban transitions in Europe and China

Deliverable N° D5.2

WP N°5 Education, participation and awareness

IMPLEMENTATION OF THE EDUCATIONAL DIGITAL PLATFORM

Author(s): **Stine Casparij Kondrup (INTU), Marie Yvonne Rasmussen Dahlfelt (INTU)**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no.821016 This document reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.

Document Information

GRANT AGREEMENT No.	821016
DOCUMENT TYPE ¹	O (Website)
WORKPACKAGE No. /TITLE	WP5 Education, participation and awareness / Implementation of the educational digital platform
LEAD CONTRACTOR	INTU
AUTHOR(S)	Stine Casparij Kondrup (INTU), Marie Yvonne Rasmussen Dahlfelt (INTU)
REVIEWED BY	Gertrud Lynges Esbensen (AU), Marianne Zandersen (AU)
PLANNED DELIVERY DATE	28.2.2022
ACTUAL DELIVERY DATE	25.2.2022
DISSEMINATION LEVEL ²	PU

¹ Type: P: Prototype; R: Report; D: Demonstrator; O: Other.

² Security Class: PU: Public; PP: Restricted to other programme participants (including the Commission); RE: Restricted to a group defined by the consortium (including the Commission); CO: Confidential, only for members of the consortium (including the Commission).

Copyright Statement

The work described in this document has been conducted within the REGREEN project. This document reflects only the REGREEN Consortium view and the European Union is not responsible for any use that may be made of the information it contains.

This document and its content are the property of the REGREEN Consortium. All rights relevant to this document are determined by the applicable laws. Access to this document does not grant any right or license on the document or its contents. This document or its contents are not to be used or treated in any manner inconsistent with the rights or interests of the REGREEN Consortium or the Partners detriment and are not to be disclosed externally without prior written consent from the REGREEN Partners.

Each REGREEN Partner may use this document in conformity with the REGREEN Consortium Grant Agreement provisions.

CONTENT

DOCUMENT INFORMATION	1
1 INTRODUCTION	4
1.1 Purpose and scope of the document	4
1.2 Acknowledgements	4
2 DESCRIPTION OF THE PLATFORM	5
2.1 The aim of the educational material	5
2.2 Organisation of learning content	6
2.2.1A Diverse City – about solutions to increase the level of biodiversity	6
2.2.2The Sound of City – about solutions to reduce noise pollution	6
2.2.3Hot City – about solutions to prevent heat-islands.....	6
2.2.4Urban Wetlands – about solutions to prevent flooding in the city.....	6
2.2.5Clean Air in the City – about solutions to reducing air pollution	7
2.3 Exercises and activities.....	7
2.3.1Reflections	7
2.3.2Learning through movement and sensation	7
2.3.3The creative corner	7
2.3.4Exploring the neighborhood.....	7
2.3.5Scientific experiments and investigations.....	8
3 TESTING IN URBAN LIVING LABS IN EUROPE	8
3.1 Den Grønne Friskole, Copenhagen - Denmark.....	8
3.1.1Test of exercises, May 2021	8
3.1.2Nature-based mini projects from school children, May - June 2021	9
3.1.3Test of launched BETA version, January 2022.....	10
3.2 Kerteminde Byskole, Denmark.....	11
3.3 Testing with two schools in Argenteuil, Paris ULL.....	11
3.3.1Test of visuals, interpretations, and interactive features, May 2021	11
3.3.2Test of BETA version, February 2022	12
4 CONCLUSION	12

1 INTRODUCTION

1.1 Purpose and scope of the document

This document is a description of the deliverable D.5.2 *'Implementation of the educational digital platform'* in WP5 *'Education, Participation and Awareness'*.

INTU is lead on T5.2 *Technology for nature-based learning* focussing on developing a digital educational platform to promote active physical and cognitive engagement with nature and facilitate experiences that generate reflection on NBS.

The purpose of this document is to announce the launch of the BETA version of the digital educational platform, [Greenopolis](#). The Greenopolis is licensed under the creative commons licenses CC BY_ND by Intugreen.

1.2 Acknowledgements

I would like to use this opportunity to acknowledge the team effort it has been to develop Greenopolis. From conceptual ideas to a final digital product. First and foremost, a big thanks to Rasmus Egede Grønbech, CTO at Intugreen, for the sparring during the whole process, the patience during a pandemic time, and the development of the final product. Another huge thanks to Marta Netza, Multimedia Designer at Intugreen, for her calm, steady, and optimistic spirit during the creative process and the final development. I would also like to thank Marie Yvonne Rasmussen Dahlfelt for being a supportive and always smiling colleague assisting in writing the educational content and testing it with schools – both physically and digitally during pandemic lock downs. Thank you to Carl Otto Moesgaard and his creative talents that turned an idea into a living online universe. Thank you to Ann-Sophie Hulquist Hansen for using her experiences as teacher in the development of educational content and exercises.

I would also like to acknowledge the continuously sparring and inspiration from the partners of REGREEN, with a special thanks to Gertrud Lyng Ebsen, PostDoc at Aarhus University, for her professional approach to the topics of Kids, Nature, and Technology. I learned a lot from you and your former and on-going research. Thank you to Sally Andersson, PhD, Associate Professor at Aarhus University, for leading WP meetings, and making sure that knowledge is shared across partners. Thank you to Jeppe Læssøe, PhD, Associate Professor at Aarhus University, for sparring and academic background about citizen science, and to partners at Museum of National History Paris; Ann-Caroline Prevot, Research Director, Mara Jimenez, PostDoc, and Simon Benateau, Deputy Coordinator at Vigie-Nature Ecole for helping out during the testing of the prototype in schools in Paris ULL.

Final but not least, a big thank you to all the school leaders, teachers, and inspiring school children in the ULLs and other cities for sparring during the entire process, for testing both reading content and exercises, for feedback on the visuals and the technical features, and for using the opportunity to bring kids outside in nature, and learning about nature inside the class room.

Stine Casparij Kondrup

2 DESCRIPTION OF THE PLATFORM

Greenopolis is an interactive educational material about sustainable urban development and nature-based solutions. Greenopolis is developed for school kids aged 8-12. The educational material includes a digital platform and a set of exercises to be used outside in urban nature.

The digital platform is playfully illustrated as an e-book, that pupils can read by themselves or teachers can show in the classroom.

The exercises are categorised in 4 different types: 1) Reflexions, 2) Movement & Senses, 3) Box of Creation, and 4) Exploration.

The Teacher Guide gives the teacher background knowledge about the topics, and a guide on how to use the material and exercises.

In Greenopolis, we follow the character e-Boti in its exploration of solutions to fight the consequences of societal challenges, like: loss of biodiversity, noise pollution, heat islands, flooding, and air pollution.

2.1 The aim of the educational material

The aim of Greenopolis is to draw attention to the advantages of city nature and nature-based solutions (NBS).

Greenopolis introduces nature-based solutions that can be used to efficiently prevent and limit the above described challenges.

The exercises and activities included in the educational material serve as inspiration to explore the concept of NBS, and to discover, how NBS are actively being used - or not - in the pupils' local area.



Screenshot of the front page of the educational platform, Greenopolis, December 15th 2021

2.2 Organisation of learning content

The content is structured into different themes. The first theme introduces the pupils to the concepts of biodiversity, ecosystems and ecosystem services, climate change and sustainable urban development. Through Greenopolis, the pupils get a basic understanding of how NBS can help create resilient cities.

The digital learning platform is designed and developed with the aim of making the learning and exploring of NBS simple, inspiring, and motivating.

The material is divided into five themes that all treat one climate challenge and introduce relevant examples of NBS to deal with this specific challenge.

2.2.1 A Diverse City – about solutions to increase the level of biodiversity

The chapter *A Diverse City* is about biodiversity and how ecosystems are put under pressure as a consequence of an intense urban development. More and more people move to the city and thus increase the demand for infrastructure and buildings, which only leaves little space for nature. When nature only has little space, ecosystems are put under pressure. By including NBS in urban planning, we can create habitats for plants and animals.

2.2.2 The Sound of City – about solutions to reduce noise pollution

The chapter *The Sound of the City* is about noise pollution. There are sounds everywhere. The sound of humans talking, music from an apartment, cars, bicycles, and people walking on the street. When sounds become unwanted we call it noise pollution. Noise can disrupt our thoughts, our work, our concentration, and our sleep. Nature has a noise-reducing effect, so by creating green areas in the city we can reduce noise pollution.

2.2.3 Hot City – about solutions to prevent heat-islands

The chapter *Hot City* is about the urban heat-island effect. It is a phenomenon that arises when the temperature of the city surpasses that of the surrounding rural area. Cities are built of asphalt, bricks and concrete that all absorb the heat from the sun. On hot summer days, the difference in temperature between the city and the surrounding rural area can reach 3-10 degrees Celsius. Urban heat-islands are a threat to nature as well as the citizens' health. Nature does however have a cooling effect, so by creating for example green roofs or pocket parks we can lower city-temperatures and reduce the heat-island effect.

2.2.4 Urban Wetlands – about solutions to prevent flooding in the city

The chapter *Urban Wetlands* is about the challenges of cloudbursts and flooding. It is anticipated that urban areas in the coming years will experience increasing and more powerful cloudbursts. This will result in flooding of houses and roads. In modern cities, sewers lead the water away from the city, but if the rain is too powerful, the sewers are overburdened. Green areas have a capacity to absorb large amounts of water, so by including nature in city-planning we can prevent city-flooding.

2.2.5 Clean Air in the City – about solutions to reducing air pollution

The chapter *Clean Air in the City* is about air pollution. Different sources of air pollution, of which most are made by humans, are introduced to the pupils. The sources include the burning of fossil fuels, carbon and wood for when we heat our houses or drive our cars. Air pollution is unhealthy for both humans and the nature surrounding us. Planting trees is an efficient NBS to clean the air because trees transform CO₂ to oxygen. By including trees in the city planning we can reduce air pollution.

2.3 Exercises and activities

We have put together a series of exercises and activities as an inspiration to include nature in the lessons. The exercises and activities bring the learning about NBS into play in new and different ways through reflections, movements and sensations, creative sessions, exploration of the neighbourhood, as well as scientific experiments and investigations.

2.3.1 Reflections

Exercises within this category give the pupils the possibility to reflect about the subject and put it into perspective. The exercises can be done individually or in groups, and the exercises do not require any materials or prior preparation.

2.3.2 Learning through movement and sensation

Bodily learning is an important element in Greenopolis. The pupils get out of their seats for a physical activity that can be carried through in the classroom or outdoors. The activities add a physical and bodily element to otherwise abstract concepts. The materials and preparation needed for the activities is described in the teacher's book, as well as questions for further discussion on the subject.

2.3.3 The creative corner

Through the creative corner, the pupils will translate their newly acquired knowledge to creative products, bringing creativity and imagination into play. The materials and preparation needed for the activities will be described in the teacher's book, as well as questions for further discussion on the subject.

2.3.4 Exploring the neighborhood

These exercises bring the pupils out to an exploration of their neighbourhood. The pupils will investigate local nature-based solutions and how they work. The exercises do not require any materials, but it is recommended that the teacher makes a personal investigation of the respective nature-based solutions beforehand. The activities might be more or less time-consuming, depending on the location of the destination. Questions for further discussion on the subject can be found in the teacher's book.

2.3.5 Scientific experiments and investigations

The exercises offer the pupils a possibility to make scientific experiments and investigations related to the subject. The pupils will use the newly acquired knowledge from the digital learning platform for the discoveries and conclusions they make through the exercises. The exercises require materials specified in the teacher's book, as well as teacher preparation in relation to the aim of the respective exercises, procedure, and background knowledge and understanding. Questions for further discussion can be found in the teacher's book.

3 TESTING IN URBAN LIVING LABS IN EUROPE

When developing the prototype, we facilitated learning situations in Denmark and France to get an understanding of the target group and the context in which Greenopolis should be implemented.

3.1 Den Grønne Friskole, Copenhagen - Denmark

3.1.1 Test of exercises, May 2021

We did the initial tests in Copenhagen, May 2021, in collaboration with Den Grønne Friskole. A School that has a high focus on sustainability and integrated nature-learning. The teachers are very engaged, and the pupils are used to be taught outside in the nearest urban nature spaces. We chose to do the teaching and testing of the exercises outside. Due to Covid restrictions, we could only be outside, and used this opportunity to observe, how the pupils interacted with the natural surroundings during the exercises. Despite the heavy rain that day we saw, that the pupils started pointing out small elements like snails, shells, insects on the water surface, and goose excrements that were not part of the activity, however the activity activated their senses towards other things as well.

We have seen during the tests, that teachers are the gate way to make it the learning experience outside a good experience, because if they are not comfortable getting outside with the pupils, they tend not to use this kind of material or look for the opportunities in nature-learning.

We learned from the test with the school in Copenhagen, that the activities outside had to be short and precise, and due to changing weather conditions, it is important to prepare everyone before leaving the school/indoor.



Photo from the test of exercises outside with Den Grønne Friskole, Copenhagen, May 4th 2021

3.1.2 Nature-based mini projects from school children, May - June 2021

Parallel to the testing of the exercises, we collaborated with the school leader and teachers in developing an educational program about nature-based urban development targeting school classes in grade 4th - 7th. The classes work on the assignment and the results has been extremely valuable positive.

All groups understood the assignment to perfection, and all the outputs of the assignment can be found here: <https://naturbaseretbyudvikling.weebly.com/undervisningsmateriale.html>



Minecraft udstilling om bæredygtigbyggeri



Tips til bæredygtig byggeri, med Minecraft



Byg dit eget Insekthotel



Vild med Vilje - Vild natur i byen



Den Grønne Natur quiz og memory spil!



Lær igennem spillet "Røgræs"

Images from the school presentations, 4th – 7th grade at Den Grønne Friskole, Copenhagen, 2021

3.1.3 Test of launched BETA version, January 2022

We contacted five schools in the beginning of January 2022 in order to receive the feedback on the BETA version of digital educational platform of Greenopolis. We launched the platform December 15, 2021, and all five schools showed interest in testing the platform. However, at this moment we only have feedback from Den Grønne Friskole. On February 9, 2022, a meeting was held with the school leader and teacher from Den Grønne Friskole who presented her feedback to the material.

Overall, the school leader and teacher had a good impression of Greenopolis, stating that the matter of nature-based solutions and sustainable urban development is an important agenda to pass on to the pupils. She is satisfied with the academic content of the material.

They liked the colorful illustrations and the universe of the material, but is however missing pictures and photographic examples from the “real world”, in order to put it into a relatable perspective for the pupils. They also mentioned that it would be nice with some extra interactive features to take more advantage of the digital media.

We elaborated on the exercises based on the feedback we got in the initial testing, and this time, the teacher praised the catalogue of exercises, and especially the variation of types of exercises, including both short reflections, scientific experiments and proposals of field trips. She found the exercises well explained and very usable, also in other educational contexts. As a conclusion to a teaching course where the entire material is completed, she suggested ideas for larger practical exercises or projects where the students get to apply all the knowledge they have acquired through Greenopolis.

She found the Teacher Guide well organized and disposed. She did not mind that the section with factual background information could be expanded with more information. Likewise, she recommended adding specific examples of how the lessons and teachings could be organized within each chapter.

The teacher and the school proposed to implement the platform in teaching when the photographic examples of NBS have been added.

3.2 Kerteminde Byskole, Denmark

Due to the Covid-19 restrictions, we did some online tests with school teachers from other schools that did not have an obvious 'green'-curriculum.

For example, we did an online test with the prototype with a biology teacher at Kerteminde Byskole, Fyn, Denmark. This test showed quite contradicting results.

The biology teacher was not very keen on the visual look of the material and found it very incorrect, due to the colours of the plants and animals, and could not see himself use this material. However, doing the second test with him, he invited a pupil to participate, and Carl from 6th grade found it very amusing and interesting. He did not mind the '*wrong*' colours for the animals, and would find it very nice to use in school, which made the teacher wanted to test the material in a class lesson (by February 2022 still waiting for feedback on this).

3.3 Testing with two schools in Argenteuil, Paris ULL

3.3.1 Test of visuals, interpretations, and interactive features, May 2021

During the project meeting in Paris 13th – 17th of September, 2021, Museum national d'histoire naturelle (MNHN) arranged visits to two schools in Argenteuil.

We found that the French educational system is very different from the Danish. The main differences we found was 1) digital devices are not as available to the pupils in French schools than in Danish school, 2) the security and rules of leaving the school are more strict and requires more permissions than in the Danish system, and 3) the amount of urban nature areas in the school yards or the nearest surroundings are less in Paris.

There is a high level of security in the French school system, and there were fewer possibilities for the teachers to bring the pupils outside the school. Furthermore, it was not allowed to use own digital devices in the schools. The digital tools available were school computers and the interactive board, which we used for the test.



The photo to the left is from a school where we tested with kids aged 6 years. The photo to the right is from another school where we tested with kids aged 11-12 years.

3.3.2 Test of BETA version, February 2022

With the support of REGREEN partner, Mara Sierra Jimenez from MNHN, we engaged a French teacher, that wrote back that she will gladly provide Intugreen with feedback on Greenopolis. Her first impression going through the platform is very positive:

“Ce que j’ai vu en parcourant la plateforme me paraît formidable.”

“What I have seen going through the platform rapidly looks amazing.” The teacher will be going through the material with her students after winter break, starting on March 7 2022.

4 CONCLUSION

The digital educational platform has been launched December 15th 2021 in a Beta version. The constant changing restrictions due to Covid-19 has made it very difficult to do continuously testing, and co-develop the material with teachers and pupils in the REGREEN ULLs. Therefore, we have decided to launch Greenopolis a BETA version, where there is room for improvement based on the feedback from real class teaching usage.

Greenopolis is available in English, Danish, French, and the REGREEN partner, ZEZ, would very much like to translate the material into Croatian and promote it to Croatian schools during 2022.

The BETA version of Greenopolis is available online here: <https://greenopolis.intugreen.dk>. The Greenopolis is licensed under the creative commons licenses CC BY_ND by Intugreen.