

Title

Nature Puzzle Game with Physical Education

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Abstract

The main goal of this learning scenario is to help students realize that the school environment, where they spend a lot of time, is very important for their health, well-being, concentration and studying efficiency. The aim is also to help students become more conscious about the natural environment's impact on their health. To do so, the first action would be to measure certain air-quality parameters at school. A brainstorming activity will then take place. The students will discuss how to improve air quality at school and then further debate on how they could make school spaces greener. If needed, they could set up a green-wall concept for their school, and eventually build it.

Keywords

Nature, Active Life, Trees, Physical Education

Introduction (leave this section as it is)

"Nature-based solutions (NBS) are solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes, and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services." https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en

To use this Learning Scenario more effectively, teachers are encouraged to:

- Check out the [list of recent EU publications on Nature-Based solutions](#)
- Read about [Nature-based solutions: Transforming cities, enhancing well-being](#) (also [available as a PDF](#))
- Contact local NBS practitioners or scientists working in their area (they can be found through [Oppla](#)).
- Use the "[Ask Oppla](#)" service to request help in case of any technical/scientific question on NBS.

Overview**Table of summary**

Subject

Physical Education, Science, Geography

Table of summary

<i>Topic</i>	<p>Indicate below which of the nine NBS topics your learning scenario addresses:</p> <ol style="list-style-type: none"> 1. Understanding NBS 2. Climate mitigation and adaptation; 3. Water management; 4. Disaster Risk Reduction; 5. Green spaces and urban regeneration; 6. Public health, well-being and air quality; 7. Participatory planning and governance; 8. Social justice and social cohesion; 9. Economic opportunities and green jobs
<i>Age of students</i>	14-17
<i>Preparation time</i>	45 min
<i>Teaching time</i>	80 min
<i>Online teaching material</i>	Padlet, Kahoot, Canva
<i>Offline teaching material</i>	Exercise mats, Jump ropes,
<i>NBS resources used</i>	<p> https://connectingnature.eu/ https://www.hindawi.com/journals/usr/2015/137027/ https://www.gla.ac.uk/myglasgow/news/campus/headline_602002_en.html https://oppla.eu/casestudy/18430 https://oppla.eu/casestudy/19448 https://urbannext.net/aime-cesaire-primary-school/ https://portals.iucn.org/library/node/46191 https://www.researchgate.net/publication/318204825 Urban natural environments as nature-based solutions for improved public health A systematic review of reviews https://www.co2meter.com/ </p>

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Integration into the curriculum

The learning scenario aims to offer a theoretical framework for the introduction of NBS in technical/engineering classes in high schools. Students will broaden their knowledge both of strictly STEM subjects and green thinking as applied to various technical topics. They will increase their vocabulary and understanding of social and environmental challenges, and possible solutions using nature, such as green infrastructure. Students will also practice how to address these issues practically, analysing and modelling them, and proposing their solutions, with a look to participatory planning

and governance. Additionally, they will learn how to search and use online information sources in a foreign language, which is also a crucial element of the national curriculum.

Aim of the lesson

Provide general knowledge about NBS
 Implement ideas on how to improve school atmosphere
 Plan the changes in school life and atmosphere – “How to make our school greener?”

Outcome of the lesson

Understand what NBS means
 Elaborated discussion and findings via presentations and teamwork on how to make the school greener.

Trends

Student-Centred Learning: students and their needs are at the centre of the learning process.
 Learning materials: shift from textbooks to web resources and open source books.
 STEM Learning: increased focus on Science, Technology, Engineering, Mathematics subjects in the curriculum.
 Game-Based Learning:
 Collaborative Learning: a strong focus on group work.
 Assessment: the focus of assessments is shifting from "what you know" to "what you can do."

21st century skills

Learning and innovation skills: students are asked to provide a solution by means of collaborating. Critical thinking: students conduct their own research to interpret the meaning of the chosen sources.
 Creativity and innovation: the learning scenario encourages creativity and innovation by engaging students in several activities.
 Collaboration: students will have to work as a team, decide upon the best way of presenting the information, take responsibility and contribute to finding the best results.

Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your learning scenario needs to relate to nature-based solutions. If you are using any external documents, please scroll to the end of the document and add them to the Annex. Add more rows to the table if needed.

Name of activity	Procedure	Time
What are Nature-Based Solutions?	<p>The main aim of this session is to explain the meaning of the acronym NBS and watch a couple of videos: A 3 minutes video from South America IUCN (International Union for Conservation of Nature) about NBS. A 3 minutes video from IUCN about climate change and NBS. Extra sources that can be used, if the teacher thinks it would help, but are not be obligatory: https://www.nature-basedsolutions.com/ https://www.tudelft.nl/myanmar/nature-based-solutions/ https://www.womenforwater.org/wfwp-at-cop24-why-is-it-difficult-to-implement-nature-based-solutions-for-water-management.html http://www.eclipsemechanism.eu/apps/Eclipse_data/website/EKLIPSE_Report1-NBS_FINAL_Complete-08022017_LowRes_4Web.pdf https://www.iucn.org/commissions/commission-ecosystem-management/cem-resources/nature-based-solutions</p>	10 minutes

Name of activity	Procedure	Time
Examples of NBS	Teachers and students will visit and explore together real examples of NBS, using the website of the two projects below: Nature4cities project proGlgreg project The Atlas of NBS in European cities shows the extent of NBS in more than 100 European cities, while this NBS example from Spain is an example close to the author's school, in Toledo. Teachers from other cities/countries can find similar examples close to them in the Atlas and using the Oppla case study finder .	20 minutes
I understood what NBS is	Here students should capture with their mobile phones a QR code linking it to an interactive map (such as zeemaps). The interactive map will be created beforehand by the teacher. The High School will be identified on the map, so students can search for examples of NBS in the vicinity and mark newfound places. They should add a website and a picture of this action.	20 minutes
Session 2		
Game	Nature Puzzle Game	40 minutes

Assessment

I have evaluated my students' understanding of NBS during the learning scenario using the [NBS online game](#) and through the interactive map students filled during the classes.

Student feedback

- They thought there was an appropriate choice of methods, tools, materials to support their work performance.
- They were able to apply their content knowledge from scientific literature and data comparison to analyse and solve a real-world problem.
- They learned how creativity, coupled with knowledge from their chosen school subjects, could be used to tackle real-world challenges in their community.

Teacher's remarks

The most relevant innovation of this LS is the integration of sustainability thinking and NBS with future technological innovations. In current fast-changing societies, interdisciplinary innovative solutions are crucial to address socio-environmental problems. And students should be aware not only of how to plan but also find funds and present these solutions captivatingly. To me, the most positive achievement is that students were enthusiast to work analysing various cases, conducting discussions, determining challenges (e.g. ownership of land for construction). Also, the creation of the projects went extremely well. Students developed comprehensive projects considering existing terrain conditions, access to utilities, location in sunny places, etc. And a preliminary visualisation of the object was carried out using Fusion360. During the presentation, many interesting ideas emerged. Students expressed their opinions and proposed sources of potential financing, facility management, and they put forward the idea of involving young people in a student cooperative association.