

WP4 NBS Academy Lesson Plan for Pre-service Teachers

Date	x	Time	x	Duration	80 minutes	Target group: 10-12 years old	Pre-service teachers
Subject	Natural Sciences, Environmental and Sustainability Education						
Topic	Urban Heat Island Effect						
Learning Outcomes	<ul style="list-style-type: none"> To understand and explain the cooling effect of plants (evaporation and transpiration). To propose Nature-based Solutions on a model idea. To discuss their models and agree on a shared one to present in the community for implementation. 						

Lesson objectives	Description of the activity	Assessment	NBS Thinking Tool
	<p>Introduction Activity (10 minutes)</p> <p>The teacher presents to the students a short dialogue between two kids raising the question: <i>How do Natural surfaces like plants have this cooling effect resulting in lower temperatures than Artificial ones?</i> based on what had been discussed in the previous lessons. The dialogue is provided in Worksheet 3. The students will then engage in a class discussion to brainstorm possible answers to this question. The teacher will write the students' ideas on the board.</p>	<p>How do Natural surfaces like plants have this cooling effect resulting in lower temperatures than Artificial ones?</p> <p>Why do you think Natural surfaces like plants have lower temperatures than artificial ones?</p>	
<ul style="list-style-type: none"> Explain the cooling effect of plants (evaporation 	<p>Activity 1 (25 minutes)</p> <p><i>A visualization of the transpiration process of plants:</i></p> <p>After triggering students' interest, the teacher presents a picture illustrating a visualization of the process called transpiration</p>	<p>What is the reason for the cooling effect</p>	<p>Step 3 & 4: Define the challenge that you want your solutions to address/manage and</p>



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<p>and transpiration).</p>	<p>provided by Activity 1 in <u>Worksheet 3</u>. The students will be able to understand how plants absorb water (roots-> stems -> leaves). The visualization will also show that plants have the ability to evaporate back into the environment some amount of the water they absorbed through the small openings on their leaves (evaporation process in plants). Based on their understanding, the students will be asked to answer some questions provided in Activity 1 in <u>Worksheet 3</u>. After all the students answer the questions, they will engage in a small class discussion presenting their answers. A more detailed description of how to conduct this activity with the students is provided in <u>Activity Sheet 3</u>.</p>	<p>plants have?</p> <p>What happens to the water absorbed by the plant's roots?</p>	<p>look for solutions in nature.</p>
<ul style="list-style-type: none"> Propose Nature-based Solutions on a model idea. 	<p>Activity 2 (25 minutes) <i>Proposing nature-based solutions for their schoolyard on a model idea:</i> The teacher will present to the students a picture of their schoolyard and the initial problem as shown in Lesson 1 (<i>How could we improve our schoolyard to be able to use it more during summertime?</i>). Following, the teacher will present the students' task which is to make a model (representation) of their solutions to showcase their ideas to the rest of their community (headteacher, parents, mayor and the other students). The teacher will divide the students into groups and ask them to think of possible solutions based on everything they learnt. Each team will need to fill in the table in Activity 2 in <u>Worksheet 3</u> with each material they will need and the corresponding role in the model. Also, under the table they must write a short explanation of their ideas. A more detailed description of how to conduct this activity with the students is provided in <u>Activity Sheet 3</u>.</p>	<p>How can we improve our schoolyard to be able to use it more during the hot summer days?</p> <p>In what ways will we use the knowledge gained to propose solutions to the problem?</p> <p>Is there an easier solution to use as a material? Try thinking of something more economic you could replace it with.</p>	<p>Step 3 & 4: Define the challenge that you want your solutions to address/manage and look for solutions in nature.</p>

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<ul style="list-style-type: none"> Discuss their models and agree on a shared one. 	<p>Activity 3 (20 minutes) <i>Agreeing on a shared model idea:</i> Each group presents its model to the whole class. All the students will engage in a class discussion to choose one model for the next lesson. To make this elimination process easier a list with evaluation criteria will be given to each team by the teacher provided in Activity 4 in <u>Worksheet 3</u>. The team with the most points at the end of the discussion will be the one whose idea of modelling will be chosen for the next lesson. By the end of this lesson, the required materials for the modelling activity will be shared with the students. A more detailed description of how to conduct this activity with the students is provided in <u>Activity Sheet 3</u>.</p>	<p>Does this model serve its intended purpose?</p> <p>Does this model incorporate Nature-based Solutions?</p> <p>Can you think of any difficulties or challenges in preparing this model? How can you overcome them?</p>	<p>Step 5: Design possible solutions that can reduce the climate and biodiversity-related challenges identified.</p>

Summative Assessment:

The summative assessment will be done with questions provided by the teacher engaging students in open discussions in class.

Activity 3 also serves as an assessment for the entire lesson.

Suggested Reading:

Transpiration process: [Transpiration | Water Cycle | Science for Kids - YouTube](#) & <https://www.youtube.com/watch?v=5jJLfwTkGe8>



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