Interactive Biodiversity Lesson Plan

Developed and tested during the PLANET4B project

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PLANET4B

BETTER DECISIONS FOR BIODIVERSITY AND PEOPLE

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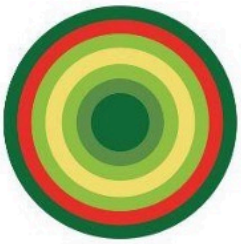

PLANET4B

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Nature and Us: From Problems to Solutions

Lesson objective: To explore pupils' relationship with nature from cognitive, emotional, and behavioural perspectives within a 45-minute interactive session.

Recommended age group: 7-10 years, max. 24-30 participants, divided into three groups of roughly equal size.

Targeted environmental competences: Systems thinking, critical thinking, creative thinking.

Required materials:

- 7 flipchart sheets or large wrapping paper
- 1 pad of post-its
- 8–10 coloured markers (whiteboard or permanent)
- 1 deck of storytelling cards (e.g., Dixit, OH Habitat, or ECCO card set)
- 1 bell, or any sound-making tool that can be clearly heard

Suggested location: Outdoors or indoors, ideally with three stations not too far apart from each other.

Facilitation:

- Ideally, there should be one facilitator waiting for the students at each location (i.e., a total of three facilitators). The facilitators can document the teams' work with photographs and prepare blank flipchart paper for the new team.
- If tasks are printed out for the three stations and each student team elects a captain to coordinate the team's work, the students can complete the tasks independently.

Lesson structure:

- Introduction (2 minutes): Work in three groups at three locations during the lesson. Each group visits each location. At each location, one topic is discussed together. Students have appx. 10 minutes for discussion and problem-solving at each location. After 10 minutes, ring a bell to signal that the groups should change locations.
- Group-forming (5 minutes): We recommend random grouping, e.g., students draw three different colours of paper from a hat, and those who draw the same colour are placed in one group (any other grouping method is also acceptable).
- Moving to the three stations (2 minutes): each group goes to one of the locations.
- Group work (3x10 minutes + 2 minutes to change locations):
    - **Topic 1: Environmental awareness** (cognitive level) – drawing a mind map
        - Guiding questions: *What do you think are the three biggest environmental issues today? Why do you think so?*
        - Individual work, where everyone gets 3 post-its on which they can write three words each. When they are ready, they put their post-its on the flipchart paper one by one and briefly explain why they wrote what they wrote.
        - Preparation: blank flipchart paper with the question "What do you think are the three biggest environmental issues today?" written in the middle, blank post-its and pens next to the paper.

- **Topic: 2 Emotions related to changes in the environment** (emotional level) – use of storytelling cards
  - Guiding question: *What do you feel when you think about the diversity of nature and the richness of animal and plant species?*
  - In a few minutes, everyone should choose the storytelling card that most captures their imagination, the one that best expresses how they feel about the question asked. Then, one by one, they place the card they have chosen on the flipchart paper and explain in one or two sentences why they chose it.
  - Preparation: blank flipchart paper with the words "What do you feel when you think about the diversity of nature and the richness of animal and plant species?" written in the middle, a deck of storytelling cards spread out on the table.
- **Topic 3: Possible actions to act on environmental problems** (behavioural level) – creating a living picture
  - Guiding question: *What can you do to preserve biodiversity?*
  - After a brief discussion, students create a living picture that expresses their possible actions. They can let their imagination run wild, take on any role they like (personify anyone/anything involved, even someone representing a natural element, object, or tool). They should pick a director/narrator who explains the message of the living picture.
  - Preparation: none

- Closing (1 minute): After the third round, everyone gathers in one place and says goodbye. If there is time left over (e.g., the group work at each location was shorter than expected), you can ask the participating students what they liked best or what they learned from each other today.

Inspirational image (Szentendre, 2023)

Experiencing Biodiversity

Lesson objective: to impart knowledge related to biodiversity and to enable students to experience the key role of biodiversity in a 45-minute interactive lesson.

Recommended age group: 10-13 years, ideal class size 16-24 students.

Targeted environmental competences: knowledge related to sustainable development, awareness of the ethical dimension of sustainable development, systems thinking.

Materials needed:

- Post-it notes for the students, on which names of species have been written in advance. Selected species should be diverse but all belong to the same ecosystem, ideally including plants, animals, fungi, or even bacteria, protected and invasive, nice and ugly, etc. The species list should include a human, too.
- 1 ball of yarn

Recommended location: outdoors or indoors (if in a classroom, move the desks and tables to the edges of the room to create a larger space in the middle).

Facilitation: A facilitator is needed to ask questions and coordinate the participating students.

Lesson structure:

- Introduction (2 minutes): In today's lesson, we will play games related to biodiversity. Have you ever heard the term biological diversity or biodiversity? If so, would anyone like to explain what it means? (If the students answer no to this question, we will not give them the definition, but we will reassure them that by the end of the lesson they will hopefully have some idea about it).
- Handing out species names to the students (3 minutes): Let's stand in a circle! In today's lesson, we will all become part of a forest community (or any kind of ecosystem that is typical for the area). You will find the name of a species written on the post-its that have been handed out. Please familiarise yourselves with the species you have been assigned, then stick the post-it in a clearly visible place on your clothes. (The facilitator walks around and gives everyone a pre-labeled post-it.)
- **Game 1: Taxonomic classification** (10 minutes)
    - *Let's see: who here is a plant, and who is an animal?* Those who think their species is an animal should stand on the right, and those who think their species is a plant should stand on the left. Those who are unsure about the classification should remain in the middle.
    - Once everyone has taken their place, discuss whether everyone is in the right place. The facilitator asks the group about each species name individually to see if they agree with the classification or if the student should be placed elsewhere. The same procedure is followed for those who are unsure. If the students do not know the answer, the facilitator will help them find the right group. Key learning points:
        - The species list also includes fungi or bacteria species. Create a third group for fungi and a fourth one for bacteria and discuss how they are similar to and different from the other two groups.

        - Humans are also included in the species list. We classify humans as animals, but we can discuss what characteristics distinguish them from other animal species. This also gives us an opportunity to draw attention to characteristics of animals that are often unknown (e.g., memory, use of tools).
- **Game 2: Classification according to usefulness** (10 minutes)
    - *Which species are useful to wildlife and which are useless?* Those who think their species is useful should stand on the right, those who think it is useless should stand on the left! Those who are unsure should stay in the middle.
    - Once everyone is in position, discuss whether everyone is in the right place. The facilitator asks the group about each species name individually to see if they agree with the classification or if the student should stand somewhere else. The same procedure is followed for those who are unsure. If students do not know the answer, the facilitator will help them find the right group. Key learning points:
        - During the game, it becomes clear that all species are useful to other species (and often directly to humans) – this is even true for species that are often considered "ugly" or "annoying" (e.g., flies, spiders).
        - In the case of invasive species, we discuss how they are essential in their own ecosystems, but their presence can cause problems in alien environments.
        - When classifying humans, we can reflect together on the negative environmental processes caused by humans and brainstorm activities that have a positive impact on the natural environment.
- **Game 3 (optional!): Classification according to protected status** (only play this if there is plenty of time left after discussing the previous two questions) (5 minutes)
    - *Which species among you are protected in our country, and which are not?* Those who think their species is protected should stand on the right, those who think it is not protected should stand on the left! Those who are unsure should remain in the middle.
    - Once everyone is in position, discuss whether everyone is in the right place. The facilitator asks the group about each species name individually to see if they agree with the classification or if the student should stand somewhere else. The same procedure is followed for those who are unsure. If the students do not know the answer, the facilitator will help them find the right group. Key learning points:
        - Even within relatively common species, there may be protected and rare subspecies that are not always easy to distinguish from each other, which is why it is important not to pick anything or harm any living creatures when walking in the forest.
        - We can once again draw attention to the problems caused by invasive species (e.g., their presence can also threaten native protected species).
- **Game 3: Interdependence of species** (10 minutes)
    - *Which of the species personified in this round are essential to the others?* Think about whether there is a species in the room that provides habitat or food for the species you are personifying, or is important for some other

reason. Stand next to the person you are closely connected to (as a forest species) and hold their shoulder.
    - The facilitator can help students find their place – usually in smaller groups of 3-4, they first find the connection points, but the species list is compiled in such a way that a complete chain can be built. Key learning points:
        - Nobody stands alone in nature – we need others to survive.
        - There are some species that are connected to many others; these are the key species in an ecosystem.
        - Decomposers (e.g., fungi, earthworms) close the cycle – they provide food for many other species, but at the same time they break down the dead bodies of others.
- Closing (10 minutes)
    - Stand in a circle so that everyone can see each other.
    - The facilitator starts the ball of yarn: they throw it to a student opposite them, holding on to the end of the yarn, and ask the students to throw it on in the same way. In a few minutes, a spider web-like network will form between the members of the class.
    - *What does this remind you of?* Encourage the students to share their opinions.
    - Now I would like to ask 2-3 people to let go of the section of yarn they are holding. *Do the others feel a change?* Then another 2-3 people should let go of the yarn. What happened now, what do we perceive? Encourage students to share their opinions.
    - Biodiversity – the diversity of species and habitats – works in the same way as this yarn network. If there are many species, everyone finds their place and role, and the network is stable. If one or two species drop out of the system, it is not a big problem, as others can take their place and the network remains relatively stable. However, if many species fall out of the system, the network loosens and it becomes increasingly difficult for the surviving species to stay alive. This is what makes biodiversity so important – the system can thus serve and sustain life on the planet.

Species name	Taxonomic classification	Relationship with other species	Protection status (in Hungary)
Common hawthorn	Plant / shrub	Food source for tits; grows at the edge of oak woods	Not protected (but its relative, the black hawthorn, is)
Long-eared owl	Animal / bird	Feeds on bank voles and common frogs; roosts in pines by day; nests in magpie and crow nests	Protected
Hollowroot (Corydalis cava)	Plant / herbaceous	One of the first nectar sources for pollinators	Not protected
Wild boar	Animal / mammal	Feeds on acorns, fungi, and arthropods	Not protected
Bronze bolete	Fungus / edible	Lives in symbiosis with oak and beech trees	Not protected
European garden spider	Animal / arachnid	Feeds on insects	Protected
Buff-tailed bumblebee	Animal / insect	Pollinator	Protected
Oak lace bug	Animal / insect	Overwinters and feeds on oaks	Not protected / invasive

European mole	Animal / mammal	Feeds on earthworms and beetle larvae	Protected
St George's mushroom	Fungus / edible	Decomposer	Not protected (researched for potential anti-tumour effects)
Red deer	Animal / mammal	Feeds on herbaceous plants, fresh shoots, and acorns	Not protected
Speckled wood butterfly	Animal / insect	Pollinator; lays its eggs on grasses	Protected
Common frog	Animal / amphibian	Feeds on insects; prey of long-eared owl	Protected
Pedunculate oak	Plant / tree	Nesting site; fresh shoots eaten by deer; acorns eaten by wild boar	Not protected
Common hornbeam	Plant / tree	Nesting site; fresh shoots eaten by deer	Not protected (but its relative, the oriental hornbeam, is)
Scots pine	Plant / tree	Nesting site; food source for squirrels	Not protected
Blackthorn	Plant / shrub	Food source for birds and rodents	Not protected
Lady's slipper orchid	Plant / herbaceous	Nectar source; lives in symbiosis with fungi	Protected
Bank vole	Animal / mammal	Feeds on seeds, berries, and fungi	Not protected
Earthworm	Animal / annelid	Decomposer	Not protected
Magpie	Animal / bird	Feeds on insects and berries	Not protected
Firebug	Animal / insect	Feeds on plant leaves but also decomposes dead animal matter	Not protected (also used in laboratory experiments)
Blue tit	Animal / bird	Feeds on caterpillars and spiders; nests in tree holes	Protected
Smooth snake	Animal / reptile	Feeds on lizards, rodents, and insects	Protected

Table 1. Possible species list (can be freely modified or expanded)