Name of Learning Unit (LU) Topic		Water Managment Case (Irish Bog)			
NBS Context (e.g. urban rural, coastal)	NBS keywords **complete checklist at the end of the document**	Other Keywords (topics other than NBS) **add in Other below**	Linked or complementary concepts to NBS (to assist curriculum integration)	Prior learner knowledge of NBS (high, moderate, low/none)	Prior instructor knowledge/ skills/ competences of NBS or equivalent
any				moderate	moderate
Target academic subject / discipline / professional area or group	Target learners/ groups [age range of learners] if applicable	Min/ Max # of learners (if applicable)	Sector (e,g, professional, higher education, community)	Prerequisites required of learners if applicable (education)	EQF (European Qualifications Framework) level (or Irish NFQ) indicative only
General	Undergraduate	n/a	professional or higher education		EQF 6 - Irish NFQ 7/8 Ordinary/Ho...
Overall Purpose	This unit focuses on the restoration of bogs and wetlands as a critical Nature-Based Solution (NBS) for water management. The session explores the role of peatlands in carbon sequestration, biodiversity co...				
LU Summary (2-3 sentences)	This unit covers bog restoration and its role as a Nature-Based Solution for carbon sequestration and ... highlights the importance of protecting and restoring peatlands to mitigate climate change, conserve bi... It also introduces the Clonbeale Peatland Conservation Project as a case study for effective NBS imple...				
Learning Outcome 1	Understand the role of bog restoration in carbon sequestration and water management.				
Learning Outcome 2	Identify and analyze the threats to peatlands and their ecological and climate-related significance.				
Learning Outcome 3	Evaluate the challenges and opportunities of implementing bog restoration and the role of EU policies ... supporting these efforts.				
Learning Outcome 4					

LU designer resources for writing learning outcomes (click Learning Outcomes - Using Taxonomies tab or...

Activities and Elements of Learning

Aim that each learning unit include at least 4 activities for an interactive learning ex...

Time (duration of activity)	Aims - linked to NBS concepts or topics)	Link to Learning Outcome	Learning Activity [PPT Slide # - if applicable]	Teacher action/ activity (Learner action/activity)	Confirmation of learner's learning (assessment of learning)

15 minutes	Introduce bog restoration and explain its importance in carbon sequestration and climate change mitigation.	1	Introduction to bog restoration and peatland ecosystems [Slides 3-6].	Define bog restoration and explain how peatlands help with carbon sequestration and flood mitigation. Discuss the significance of Sphagnum moss and other plant species in water retention and climate regulation. Highlight the role of EU-funded projects like the Clonbeale Peatland Conservation Project.	In class discussion are designed to engage students; Learners respond to the questions and the teacher will determine understanding from their responses
15 minutes	Explore threats to peatlands globally and locally, and understand their ecological significance.	2	Case study on peatland threats [Slides 7-12].	Discuss the threats to peatlands, such as turf cutting, industrial peat extraction, and climate change. Present case studies on the exploitation of peatlands in Ireland and Indonesia and the environmental impacts of these activities. Discuss the global importance of peatlands for carbon storage and biodiversity.	Group exercise where students are tasked with analyzing one of the presented EU projects and discussing its impact on climate resilience and urban sustainability designed to engage students; Learners respond to the questions and the teacher will determine understanding from their responses

15 minutes	Analyze the **challenges** and **opportunities** of **bog restoration** projects.	3	SWOT analysis of bog restoration [Slides 13-16].	Lead a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) of bog restoration efforts, considering challenges like space limitations, community resistance, and funding issues. Discuss the opportunities for biodiversity conservation, job creation, and carbon credits from restored peatlands. Explore how EU policies can support large-scale peatland restoration.	In class discussion are designed to engage students; Learners respond to the questions and the teacher will determine understanding from their responses
5 minutes	Wrap up the session and ensure that all key learning points have been understood.	1, 2, 3	Open Discussion	Open the floor for questions and provide clarifications on the bog restoration process, threats, and EU policies. Encourage students to reflect on the role of NBS in climate change mitigation and sustainable development.	Teacher will ask follow-up questions based on students' responses to ensure key learning outcomes have been achieved. Give instant feedback on students' ability to connect NBS concepts with real-world applications.

NBS- Application of Curriculum, Trends and Skills

Curriculum integration (how it may connect to curriculum)	

Teaching & Learning Trends employed **Highlight all that apply** (Source)	**Project-based learning**: e.g., students work in groups on a research project on greenhouses and the greenhouse effect, alternatives to waste management or investigate what are the views of their peers on climate change.	**Peer learning:** e.g., students work in groups, evaluate the work of their peers, or develop assessment questions to assess peers.	**Problem-based Learning**: e.g., students are introduced to a problem and challenged to find a solution together based on the information provided to them.	**Student-centred learning:** the learning scenarios are not based on classical instruction by the teacher, but they are expected to actively engage students in the lessons.	
21st Century Skills **Highlight all that apply** (Source)*	**Creativity:** e.g., students think of various solutions for promoting a better lifestyle in their communities or encourage greener solutions to their schools' issues.	**Information/ Media literacy:** students explore examples of NBS, research similar solutions in other communities.	**Collaboration:** e.g., students work in groups and engage in task division to produce outputs.	**Critical thinking:** e.g., students learn that a debate on deforestation or climate change does not consist of two opposing camps only but involves many stakeholders with different perspectives.	**Communication:** e.g., students present their work to the whole class and learn to put forth strong arguments based on facts.

*Gras-Velázquez, À., Mulvik, I. B., Campodonio, A., Nada, C. & Pocze, B. (2020) *Nature-Based Solutions in education - Validation report, European* 25/03/2024 https://files.eun.org/NBS/NBS-pilot-validation-report-final.pdf] p.8.

GreenComp - European Sustainability Competency Framework **Highlight all that apply** (Source) 1-Embodying Sustainability Values and 2 - Embracing Complexity in Sustainability (see pp.13-14)	**1.1 Valuing Sustainability:** To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values	**1.2 Support Fairness:** To support equity and justice for current and future generations and learn from previous generations for sustainability	**1.3 Promoting Nature:** To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems	**2.1 Systems Thinking:** To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.	**2.2 Critical Thinking:** To assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.

GreenComp - European Sustainability Competency Framework **Highlight all that apply** (Source) 3-Envisioning sustainable futures and 4 - Acting for Sustainabilty (see pp.13-14)	**3.1 Futures Literacy:** To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.	**3.2 Adaptability:** To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk. generations and learn from previous generations for sustainability	**3.3 Exploratory Thinking:** To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.	**4.1 Political Agency:** To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.	**4.2 Collective Action:** To act for change in collaboration with others.
Author and organisation to credit when using the LU	Centre for Social Innovation - Trinity Business School, Trinity College Dublin				

NBS Keywords Checklist (tick here below)

	Forest Preservation
	Forest Restoration
	Forest enhanced management for woodfuel harvest
	Forest Production
	Grassland Preservation
	Grassland Restoration
	Grassland grazing management
	Coastal Preservation
	Coastal Restoration
	Coastal maintenance of slope vegetation
	Maintenance of coastal, floodplain and riverine vegetation
	Agroforestry
	Reduce tillage and carbon restoration practices
	Agricultural intensificiation
	Urban forests and green spaces
	Urban green roofs
x	Climate-change adaptation and mitigation
x	Sustainable cities/ sustainable communities

x	Re-naturing cities/ re-naturing communities	
	Urban regeneration	
	Coastal resilience	
	Multi-functional watershed management	
	Enhancing the insurance value of ecosystems	
	Sustainability of the use of matter and energy	
x	Sustainable development	
x	Innovating with nature	
x	Biodiversity	
x	Nature-based enterprises	
x	Nature-based enterpreneurship	
x	NBS and new business and investment models	
x	Citizen participation, stakeholder/community consultation	
x	Disaster risk reduction	
	Risk management and resilience	
x	NBS policy development and implementation	
	NBS research	
	Green infrastructure	
	Green finance / sustainable finance	
x	Ecosystem services and ecosystem-based approaches	
x	Rural municipal/local authority/government planning	
	Coastal municipal/local authority/government planning	
	Urban municipal/local authority/government planning	
	Improving well-being and quality of life	
	NBS and new business and investment models	
	NBS and CCAM (Connected, Cooperative and Automated Mobility)	
	Other 1: (Please specify)	nature-inspired innovations
	Other 2: (Please specify)	
	Other 3: (Please specify)	

Keywords Source 1: United Nations Environment Programme (2020). The Economics of Nature-based Solutions: Current Status and Future Priorities. United Nations Environment Programme Nairobi., p.5. (keywords above in italics)

Keywords Source 2: Faivre N, Fritz M, Freitas T, de Boissezon B, Vandewoestijne S. (2017)'Nature-Based Solutions in the EU: Innovating with nature to address social, economic and environmental challenges.' Environ Res. 2017 Nov;159:509-518. doi: 10.1016/j.envres.2017.08.032. Epub 2017 Sep 8. PMID: 28886502.

Keywords Source 3: European Commission (2015). *Towards an EU Research and Innovation policy agenda for Nature-Based Solutions & Re-Naturing Cities: Final Report of the Horizon 2020 Expert Group on 'Nature-Based Solutions and Re-Naturing Cities' Full Version. Luxembourg: Publications Office.*

Key EU NBS resources used (for instructor preparation) include link	Type of LU - lecture, workshop, field trip/site visit
	Lecture

Time for LU (aim is 50 minutes per learning unit	Course delivery format (e.g. in-person, hybrid, online)
50 minutes	Hybrid

r climate change mitigation and
onservation, and flood management.

water management. The session
odiversity, and manage stormwater.
ementation.

and community stewardship in

pyramid here)

perience

Link to online NBS resources (and/or academic resources with DOI as relevant)	Offline resources and materials (e.g. post-its,)

	Post-it notes for a **brainstorming exercise** on **NBS concepts** and how they might apply to local urban challenges.
	Post-it notes for a brainstorming exercise on NBS concepts and how they might apply to local urban challenges.

|	
	Post-it notes for a brainstorming exercise on NBS concepts and how they might apply to local urban challenges.
	NA
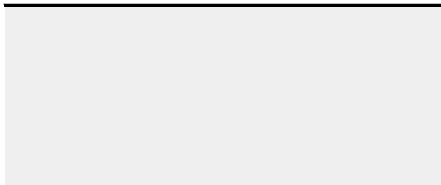
Commission, August 2020 [accessed on

2.3 Problem Solving: To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems

4.3 Individual Initiative: To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet
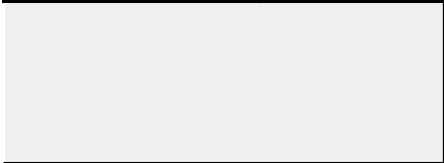
Unit and share it with
ꞑmmercially.

Teacher Resources (If 'Notes' are used in the related PowerPoint presentation please indicate here)	Learner Resources (e.g. academic articles or links) for advanced reading or review (citation in individual cells)
	NBS

Faivre et al (2017) NBS and the EU DOI https://doi.org/10.1016/j.envres.2017.08.032