

WP3: ECOTEACH Virtual Classroom



EVALUATION METHODS AND TOOLS
Practical assessment resources for
Environment-Based STEM Learning



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Teaching Science and Maths through Innovative Models of Environment-Based Learning for Disadvantaged Schools and Students (ECOTEACH)

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Coordinator



DSEL

Directorate of Secondary Education of Lassithi

Partners



Work Package 3

WP3/A6. Elaborate EVALUATION METHODS AND TOOLS

Edited by: DISRUPTIA

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Summary

This document presents the Evaluation Methods and Tools developed under Work Package 3 / Activity 6 (WP3/A6) of the ECOTEACH project.

The collection has been designed to support teachers and educators in assessing learning processes and outcomes within Environment-Based Learning (EBL) applied to STEM education, with particular attention to inclusive education and disadvantaged learners and schools.

The publication brings together 26 practical evaluation tools, organised around the six ECOTEACH Learning Units and connected with the practical learning experiences developed within the ECOTEACH Virtual Classroom.

Rather than focusing exclusively on final learning outcomes, the tools support different forms of assessment before, during and after learning activities, including teacher observation, competence-based rubrics, portfolios, self-assessment, peer assessment, reflective tools, project assessment and impact evaluation.

All tools have been designed to remain practical, adaptable and transferable to different educational realities and can be used or adapted according to learners' needs, available resources and specific school contexts.

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Introduction

Environment-Based Learning (EBL) provides meaningful opportunities for students to develop STEM knowledge and competences through direct engagement with real environmental contexts. In this approach, assessment should not be limited to measuring knowledge at the end of a learning process. It should also help educators understand how students observe, investigate, collaborate, solve problems, use evidence, reflect on their learning and apply knowledge to authentic environmental challenges.

The ECOTEACH Evaluation Methods and Tools have been developed to support this broader and more learner-centred approach to assessment. They complement the Conceptual and Pedagogical Framework, Electronic Database and Hands-On Exercises developed within the ECOTEACH Virtual Classroom, providing teachers and educators with practical instruments for monitoring learning processes, assessing competences and supporting reflection and feedback.

The collection contains 26 evaluation tools organised around the six ECOTEACH Learning Units. The tools are connected with different Environment-Based STEM learning experiences and address relevant STEM, environmental, digital and transversal competences.

The tools combine different assessment approaches, including teacher observation, competence-based rubrics, portfolios, checklists, self-assessment, peer assessment, reflective logs, project assessment and programme-level evaluation. This diversity allows educators to select the approach that best responds to the learning activity, learner profile and educational context.

Particular attention is given to inclusion, accessibility and adaptability. The tools are intended to be practical and transferable across different school environments, including disadvantaged schools and low-resource educational contexts, and can be adapted to different ages, learning needs, levels of digital access and forms of learner participation.

Evaluation approach

Purpose of the Evaluation Methods and Tools

The main purpose of the ECOTEACH Evaluation Methods and Tools is to provide teachers and educators with simple, meaningful and adaptable instruments for assessing learning within Environment-Based STEM activities.

The tools aim to:

- monitor learners' participation, engagement and progress;
- assess STEM, environmental, digital and transversal competences;
- support inquiry, problem-solving and collaborative learning;
- encourage self-assessment, peer assessment and reflection;
- provide teachers with evidence for formative feedback;
- recognise different forms of learner participation and achievement;
- support inclusive assessment practices for disadvantaged learners;
- connect assessment with authentic environmental experiences and real-world challenges;
- contribute to the continuous improvement of teaching and learning practices.

Inclusion, Accessibility and Adaptability

Inclusive assessment is a central principle of the ECOTEACH approach. Learners should have different opportunities to demonstrate what they know, what they can do and how they participate in the learning process.

The evaluation tools therefore encourage the use of clear language, visual supports, structured templates, flexible response formats and different forms of evidence.

Depending on learners' needs and the school context, evidence may be provided through written responses, oral explanations, drawings, photographs, measurements, digital products, practical demonstrations or collaborative contributions.

Digital tools can support assessment but should not become a barrier to participation. Where necessary, digital instruments can be replaced by printed or simplified alternatives.

Teachers are encouraged to adapt the tools to learners' age, abilities, language needs and level of support while maintaining the main assessment objective and criteria.

What can be evaluated?

Evaluation Dimension	Examples of Evidence
Participation & Engagement	Participation, motivation, task completion
STEM Competences	Observation, measurement, inquiry, data analysis, problem-solving
Environmental Competences	Environmental awareness, sustainability, responsible behaviour
Digital Competences	Digital documentation, data management, mapping, digital communication
Collaboration & Communication	Teamwork, peer interaction, presentation, shared responsibility
Reflection & Self-regulation	Self-assessment, reflection, metacognition, decision-making
Inclusion & Accessibility	Meaningful participation, adaptability, different ways of demonstrating learning
Pedagogical Effectiveness	Practical applicability, usefulness and transferability

Evaluation methods included in this collection

The ECOTEACH collection does not prescribe a single assessment model. Instead, it combines complementary methods that can be selected according to the activity and learning objectives.

- Teacher observation and checklists capture evidence while learners are actively investigating, experimenting or collaborating.
- Assessment rubrics provide clear criteria and performance levels for evaluating competences, processes and final products.
- Portfolios and project-based assessment document learning over time and bring together observations, calculations, photographs, digital products, reflections and other evidence.
- Self-assessment and reflective tools encourage learners to recognise their progress, difficulties and changing understanding.
- Peer assessment promotes dialogue, collaboration and awareness of individual and group contributions.

Surveys, focus groups and impact evaluation tools make it possible to examine broader outcomes, including learner engagement, behaviour and the longer-term impact of EBL within the school community.

How to use the Evaluation Tools

Each evaluation tool is presented using a common structure to facilitate its practical use and adaptation:

1. Identify the appropriate tool according to the Learning Unit and activity.
2. Review the evaluation objective and competences assessed.
3. Adapt the criteria or format when necessary to the age, learning needs and educational context.
4. Share relevant criteria with learners before or during the activity whenever appropriate.
5. Gather evidence throughout the learning process, not only at the end.

6. Use the results to provide feedback, support reflection and identify opportunities for further learning.

The tools can be used independently or combined. For example, teacher observation may be complemented by learner self-assessment, peer feedback or a final project portfolio to provide a more complete picture of the learning process.

Learning Unit 1: Foundations of Environment-Based Learning (EBL) in STEM Education

Learning Unit 1 focuses on assessing learners' understanding and application of Environment-Based Learning (EBL) in STEM education. The Evaluation Methods and Tools support teachers in monitoring how learners observe, investigate and interpret their school environment while applying STEM knowledge to real environmental contexts.

Through rubrics, portfolios, observation tools and self-assessment, educators can evaluate not only learning outcomes but also inquiry skills, environmental awareness, collaboration, reflection and the ability to propose practical and evidence-based solutions.

Learning Unit 1: Evaluation Tool 1 *My school as an environmental laboratory*

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Teacher observation rubric + Portfolio assessment + Self-assessment
Evaluation objective	To assess students' ability to investigate their school environment as a meaningful STEM learning space, conduct structured observations, identify sustainability challenges, collaborate effectively in heterogeneous groups, and propose practical, evidence-based solutions
Competences / skills assessed	<u>STEM competences</u> • Scientific observation and inquiry, • Data collection, recording, classification, and interpretation, • Application of STEM concepts to authentic environmental contexts <u>Environmental competences</u> • Awareness of local environmental issues, • Appreciation of the school as a living environmental laboratory,

	● Critical understanding of sustainability. <u>Digital competences</u> ● Digital documentation through photographs or short videos, ● Creating collaborative digital sustainability boards (Padlet) <u>Transversal competences</u> ● Collaboration and Teamwork, ● Critical and Reflective Thinking, ● Communication and Presentation Skills, ● Creativity In Proposing Sustainable Solutions, ● Active Citizenship.
Tool description	This evaluation tool supports teachers in assessing students during the "My school as an environmental Laboratory" hands-on activity. It evaluates students' active participation in field observations, the accuracy and depth of their data collection regarding sustainable and unsustainable school practices, the effectiveness of their digital documentation, and the feasibility of their proposed sustainability solutions. The tool combines formative teacher observation with portfolio evaluation to promote inquiry, reflection, and collaborative learning.
Evaluation criteria / indicators	<u>Criterion 1 – Environmental Observation & Data Collection</u> 4 – Excellent Thoroughly observes different school areas, records detailed environmental features accurately, and collects reliable and well-organised evidence from multiple sources. 3 – Good Observes relevant school areas and records clear, mostly accurate environmental information with minor omissions. 2 – Satisfactory Makes some observations and records basic environmental information but requires regular guidance to collect complete or reliable evidence. 1 – Needs Improvement Shows limited engagement in observation activities and records little, unclear, or unreliable environmental evidence. <u>Criterion 2 – Identification of Sustainability Challenges</u> 4 – Excellent; Clearly identifies key sustainability challenges and provides well-supported links between environmental quality, human behaviour, and their consequences. 3 – Good; Identifies relevant sustainability challenges and explains most links between environmental conditions and human behaviour. 2 – Satisfactory; Recognises some sustainability issues but provides limited explanations or needs support to make connections. 1 – Needs Improvement; Has difficulty identifying sustainability challenges or recognising their relationship with human behaviour and environmental quality.

	<u>Criterion 3 – Digital Documentation & Use of Tools</u> 4 – Excellent; Uses smartphones/tablets, photographs or short videos, and Padlet confidently and independently to create accurate, relevant, and well-organised digital documentation. 3 – Good; Uses digital tools appropriately and creates clear documentation with occasional support or minor inaccuracies. 2 – Satisfactory; Uses some digital tools but requires frequent guidance to document, organise, or share findings effectively. 1 – Needs Improvement; Shows limited ability or willingness to use digital tools and produces incomplete or unclear digital documentation. <u>Criterion 4 – Collaboration & Teamwork</u> 4 – Excellent; Works actively and respectfully with peers, shares responsibilities fairly, supports group members, and contributes consistently throughout the activity. 3 – Good; Collaborates positively with peers and fulfils assigned responsibilities during most stages of the activity. 2 – Satisfactory; Participates inconsistently in group work or needs reminders to cooperate and complete assigned tasks. 1 – Needs Improvement; Shows limited collaboration, does not engage consistently with the group, or rarely contributes to shared responsibilities. <u>Criterion 5 – Proposed Solutions & Presentation</u> 4 – Excellent; Proposes creative, practical, and evidence-based solutions for improving school sustainability and presents them clearly, confidently, and persuasively. 3 – Good; Proposes relevant and feasible solutions and communicates them clearly with minor improvements needed. 2 – Satisfactory; Suggests basic solutions, but they may lack sufficient practicality, detail, evidence, or clarity in presentation. 1 – Needs Improvement; Provides few or unclear solutions that are not sufficiently connected to the observed sustainability challenges; presentation is incomplete or difficult to follow.
Methodology / application	The teacher introduces the evaluation criteria before the activity begins. Throughout the 90-minute exercise, the teacher uses continuous observation while students explore the school grounds, record findings, and compile their digital boards. Assessment data is gathered from the School Environmental Observation Worksheet, group interactions, the Padlet portfolio, and the final group presentation. Formative feedback is delivered to guide student reflection and strengthen their proposed actions.
Inclusion and accessibility	The evaluation framework supports inclusive participation by accommodating flexible group roles (Observer, Photographer,

	Recorder, Presenter, Sustainability Advisor). Learners with language barriers or special needs are permitted to express their observations through photographs, drawings, or oral explanations. Alternative indoor routes are recognized to ensure equal access regardless of physical infrastructure.
Digital tools / resources	● Smartphones or tablets for field photography ● Padlet (Collaborative digital wall) ● Google Maps or Google Earth (optional) ● Canva (optional for digital posters)
Expected outcomes / usefulness	The tool provides teachers with a practical, low-cost mechanism to assess environment-based learning (EBL) in authentic school settings. It fosters critical thinking, active citizenship, and environmental responsibility while encouraging meaningful engagement in STEM among students of diverse academic abilities.

Learning Unit 1: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - Teacher observation checklist

Student / Group	
Date	
Teacher	

Evaluation Criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)	Comments / Evidence
Actively participates in observing different areas of the school environment	☐	☐	☐	☐	
Records environmental features and sustainability-related evidence accurately	☐	☐	☐	☐	
Identifies sustainable and unsustainable practices within the school	☐	☐	☐	☐	

Recognises links between human behaviour, environmental quality, and sustainability challenges	☐	☐	☐	☐	
Uses digital tools appropriately to take photographs, videos, and document findings on Padlet	☐	☐	☐	☐	
Collaborates effectively with peers and fulfils assigned group responsibilities	☐	☐	☐	☐	
Proposes practical and evidence-based solutions to improve school sustainability	☐	☐	☐	☐	

Teacher Summary

Strengths observed

Areas for improvement

Overall Performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs Improvement

MATERIAL 2 - Sustainability Investigation Checklist

Activity	Check
Observed different areas of the school environment	
Recorded environmental features and evidence	
Identified sustainability challenges	
Documented findings using photographs or videos	
Uploaded evidence to the group Padlet	
Collaborated with group members	
Proposed practical sustainability solutions	

Learning Unit 1: Evaluation Tool 2

Environmental detectives: spot the sustainability challenge

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Teacher observation rubric + Project report portfolio + Self-reflection
Evaluation objective	To assess students' ability to investigate their school environment through structured observation, identify sustainable and unsustainable everyday practices, analyze human impacts on environmental quality, collaborate effectively in heterogeneous teams, and propose practical, evidence-based solutions.
Competences / skills assessed	<u>STEM competences</u> ● Identification and classification of environmental issues ● Problem-solving through inquiry-based learning ● Evidence collection and interpretation <u>Environmental competences</u> ● Recognition of local environmental challenges ● Development of environmentally responsible attitudes and behaviours <u>Digital competences</u> ● Digital documentation using photographs or short videos ● Collaborative presentation of findings using digital platforms like Padlet <u>Transversal competences</u> ● Teamwork and collaborative decision-making ● Critical and reflective thinking ● Communication and presentation skills
Tool description	This evaluation tool supports teachers in assessing students during the "Environmental Detectives: Spot the Sustainability Challenge" hands-on activity. It evaluates the thoroughness of students' environmental observations, the accuracy of their evidence collection regarding resource consumption and waste, their use of digital tools for documentation, and the feasibility of their proposed school sustainability actions. The tool combines formative monitoring with a structured portfolio report..

Evaluation criteria / indicators	<u>Criterion 1 – Observation and Evidence Collection</u> 4 – Excellent; Carefully examines assigned school areas, uses the investigation checklist independently, and collects detailed, accurate photographic and written evidence. 3 – Good; Examines the assigned area effectively and collects relevant evidence with minor omissions or occasional support. 2 – Satisfactory; Makes basic observations but needs regular guidance to use the checklist and collect complete or reliable evidence. 1 – Needs Improvement; Shows limited engagement in the investigation and collects little, unclear, or unreliable evidence. <u>Criterion 2 – Identification of Sustainability Challenges</u> 4 – Excellent; Accurately identifies several sustainable and unsustainable everyday practices and clearly explains their relevance to school sustainability. 3 – Good; Identifies relevant sustainability challenges and distinguishes most sustainable and unsustainable practices. 2 – Satisfactory; Identifies some challenges but needs support to distinguish clearly between sustainable and unsustainable practices. 1 – Needs Improvement; Has difficulty recognising sustainability challenges or identifying everyday practices that affect the environment. <u>Criterion 3 – Critical Thinking and Problem-Solving</u> 4 – Excellent; Thoroughly analyses the causes and environmental impacts of identified challenges and proposes realistic, creative, low-cost, evidence-based actions. 3 – Good; Explains the main causes and impacts of challenges and proposes relevant, feasible improvement actions. 2 – Satisfactory; Provides basic explanations and simple solutions, but these may lack sufficient evidence, detail, or practicality. 1 – Needs Improvement; Shows limited analysis of environmental problems and proposes few, unclear, or unrealistic solutions. <u>Criterion 4 – Digital Tool Integration</u> 4 – Excellent; Uses smartphones, Padlet, and other optional digital tools confidently and independently to create clear, accurate, and well-organised documentation. 3 – Good; Uses digital tools appropriately to document and share findings, with only minor support or organisation issues.
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	2 – Satisfactory; Uses some digital tools but requires frequent assistance to record, organise, or upload findings. 1 – Needs Improvement; Shows limited ability or willingness to use digital tools; digital documentation is incomplete or unclear. <u>Criterion 5 – Collaboration and Communication</u> 4 – Excellent; Works actively and respectfully in the team, contributes to shared decisions, supports peers, and presents findings clearly and confidently. 3 – Good; Collaborates positively, participates in group decisions, and communicates findings clearly during most stages. 2 – Satisfactory; Participates inconsistently in teamwork or communication and needs reminders to contribute to group tasks. 1 – Needs Improvement; Shows limited collaboration, rarely contributes to group decisions, or presents findings unclearly.
Methodology / application	The teacher introduces the assessment criteria and investigation checklist before the activity begins. Throughout the 90-minute investigation, the teacher observes student collaboration and field data gathering. Assessment data is compiled from the Environmental Investigation Report, Padlet uploads, group presentations, and self-reflection reflections. Formative feedback is provided to help students connect daily habits with environmental sustainability.
Inclusion and accessibility	The activity and evaluation framework focus on observation, discussion, and collaborative problem-solving rather than traditional written performance, ensuring high accessibility. Designed with low-cost materials and familiar school settings, it is particularly suitable for disadvantaged schools and resource-limited educational contexts.
Digital tools / resources	● Smartphones or tablets for photographic documentation ● Padlet (Collaborative digital wall) ● Canva (optional for awareness posters) ● Google Forms (optional for comparing findings)
Expected outcomes / usefulness	The tool provides educators with a clear framework to evaluate inquiry-based environmental learning, critical thinking, and digital competence. It encourages students to reflect on their personal roles in resource conservation and reinforces active school citizenship.

Learning Unit 1: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - School Eco-Audit Poster Template

Title: Environmental Detectives: School Eco-Audit

School / Class: _____

Group Members: _____

Date: _____

1. Area Investigated

2. Sustainability Challenge Identified

3. Evidence Collected

- Photographs / videos
- Observation notes
- Checklist findings

4. Why Is This a Problem?

5. Environmental Impact

6. Our Proposed Solution

7. Expected Benefits

8. Our Sustainability Message

Learning Unit 1: Evaluation Tool 3

Where do we see Mathematics in Nature?

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Teacher observation rubric + Measurement portfolio + Peer assessment
Evaluation objective	To assess students' ability to observe and apply mathematical concepts in natural environments, conduct accurate measurements and estimations, recognize geometric patterns and symmetry in nature, and communicate mathematical findings effectively through collaborative outdoor learning.
Competences / skills assessed	<u>STEM / mathematical competences</u> • Mathematical observation and reasoning, measurement • Estimation and comparison • Geometric interpretation, data collection and analysis <u>Environmental competences</u> • Awareness of natural patterns • Connection between mathematical structures and environmental systems <u>Digital competences</u> • Using GeoGebra for geometric relationships • Documenting examples via smartphone cameras/photos • Creating digital posters or sharing findings on Padlet <u>Transversal competences</u> • Teamwork and collaborative problem-solving • Critical thinking, communication and creative presentation skills
Tool description	This evaluation tool supports teachers in assessing students during the "Where Do We See Mathematics in Nature?" hands-on activity. It evaluates the accuracy of students' environmental measurements, their ability to identify geometric shapes and symmetry in natural objects, their effective integration of digital tools (such as GeoGebra and smartphone cameras), and the clarity of their group presentations

	demonstrating the link between mathematics and the natural world.
Evaluation criteria / indicators	<u>Criterion 1 – Mathematical Observation & Identification</u> 4 – Excellent; Accurately identifies and clearly classifies a wide range of mathematical concepts, such as symmetry, patterns, shapes, angles, and proportions, in natural features. 3 – Good; Correctly identifies most mathematical concepts in nature, with only minor inaccuracies or limited detail. 2 – Satisfactory; Identifies some basic mathematical concepts but requires guidance to classify or explain them correctly. 1 – Needs Improvement; Shows limited ability to identify mathematical concepts or patterns in natural objects. <u>Criterion 2 – Measurement & Estimation Accuracy</u> 4 – Excellent; Uses rulers, tapes, or other measurement tools accurately and records precise measurements, estimations, and comparisons independently. 3 – Good; Records mostly correct measurements and estimations, with minor errors that do not significantly affect the findings. 2 – Satisfactory; Completes basic measurements but requires regular support to ensure accuracy, consistency, or correct recording. 1 – Needs Improvement; Has difficulty using measurement tools and records incomplete, inaccurate, or unclear data. <u>Criterion 3 – Integration of Digital Tools</u> 4 – Excellent; Uses GeoGebra, smartphone cameras, and sharing platforms confidently and effectively to document, analyse, and present mathematical findings. 3 – Good; Uses digital tools appropriately to record and share findings, with occasional support or minor organisation issues. 2 – Satisfactory; Uses some digital tools but requires frequent guidance to document, analyse, or upload findings. 1 – Needs Improvement Shows limited ability or willingness to use digital tools; digital work is incomplete or unclear. <u>Criterion 4 – Collaboration & Teamwork</u> 4 – Excellent; Works actively and respectfully with peers, shares responsibilities fairly, supports group members, and contributes consistently throughout the investigation.

	3 – Good; Collaborates positively with peers and fulfills assigned responsibilities during most stages of the activity. 2 – Satisfactory; Participates inconsistently in group work or needs reminders to cooperate and complete assigned tasks. 1 – Needs Improvement; Shows limited collaboration and rarely contributes to group tasks or shared responsibilities. <u>Criterion 5 – Presentation & Mathematical Reasoning</u> 4 – Excellent; Presents findings clearly and logically, using accurate mathematical language and strong evidence to explain links between mathematics and the natural world. 3 – Good; Presents findings in a clear structure and uses mostly accurate mathematical reasoning, with minor improvements. 2 – Satisfactory; Presents basic findings but explanations may lack detail, evidence, clarity, or mathematical vocabulary. 1 – Needs Improvement; Presents incomplete or unclear findings and shows limited mathematical reasoning.
Methodology / application	The teacher introduces the evaluation rubric before the 60–75 minute outdoor activity. Throughout the preparation, investigation, and presentation phases, the teacher monitors student progress and collaboration. Assessment data is gathered from observation sheets, recorded measurements, photographs, GeoGebra activities, and group presentations, followed by constructive formative feedback.
Inclusion and accessibility	The evaluation framework provides high flexibility by allowing indoor adaptations (analyzing pre-collected natural materials or photographs) if outdoor access is limited. Differentiated roles and visual supports ensure that students with diverse learning needs can contribute meaningfully regardless of school infrastructure.
Digital tools / resources	● GeoGebra (for exploring geometric relationships and measurements) ● Google Photos or smartphone cameras (for documentation) ● Canva (for creating digital math posters) ● Padlet (for sharing group findings)
Expected outcomes / usefulness	The tool helps teachers evaluate mathematics through an environment-based learning (EBL) approach, proving that math is a practical instrument for interpreting natural systems. It reinforces critical thinking, digital literacy, and student engagement in disadvantaged or low-resource educational settings.

Learning Unit 1: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - GeoGebra Activity Template

Activity title: 'Mathematics in Nature'

Group members: _____

Date: _____

Natural object observed:

Mathematical concept identified:

- ☐ Symmetry
- ☐ Geometric shape
- ☐ Pattern
- ☐ Angle
- ☐ Proportion
- ☐ Measurement

Photograph / Drawing of the object:

Measurements recorded:

GeoGebra Task:

Create or recreate the identified shape, line of symmetry, angle, pattern, or proportion in GeoGebra.

What Did You Discover?

Mathematical Explanation:

MATERIAL 2 - Nature Geometry Identification Card Template

Natural Object:

Location Found:

Mathematical Feature:

- ☐ Circle
- ☐ Triangle
- ☐ Rectangle
- ☐ Spiral
- ☐ Symmetry
- ☐ Pattern
- ☐ Angle
- ☐ Other: _____

Evidence:

- ☐ Photograph
- ☐ Drawing
- ☐ Measurement
- ☐ Observation notes

Description:

How can you see this mathematical feature in nature?

Measurement / Estimation:

Group Explanation:

Learning Unit 1: Evaluation Tool 4

Our daily water journey

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Teacher observation rubric + Water journey portfolio + Collaborative assessment
Evaluation objective	To assess students' ability to investigate how water is supplied, used, and managed within the school, develop systems thinking regarding water flow, identify water conservation opportunities, collaborate effectively, and propose sustainable water use actions.
Competences / skills assessed	<u>STEM / Interdisciplinary competences:</u> ● Problem-solving through multiple real-life environmental contexts ● Systems thinking, ● Scientific observation, and data collection. <u>Environmental competences:</u> ● Awareness of water conservation opportunities, ● Understanding freshwater as a limited resource, ● Developing environmentally responsible behaviours. <u>Digital competences:</u> ● Digital creation of water flow diagrams and visual presentations using Canva, Google Drawings, or smartphones/tablets. <u>Transversal competences:</u> ● Collaboration and teamwork, ● Communication, ● Creative presentation of environmental findings.
Tool description	This evaluation tool supports teachers in assessing students during the "Our Daily Water Journey" hands-on activity. It evaluates students' capacity to map school water systems, identify sources of inefficiency or waste, integrate digital tools for flow diagrams, and communicate evidence-based water conservation recommendations.

Evaluation criteria / indicators	<u>Criterion 1 – Water System Observation & Investigation</u> Excellent (4): Thoroughly investigates multiple school water-use locations and records detailed, accurate, and relevant observations. Good (3): Investigates several water-use locations and records mostly accurate and relevant observations. Developing (2): Investigates a limited number of locations and records partial or inconsistent observations. Needs Support (1): Conducts minimal investigation and records very limited, unclear, or inaccurate observations. <u>Criterion 2 – Systems Thinking & Water Journey Mapping</u> Excellent (4): Creates a highly accurate, clear, and well-organised water journey map showing water sources, movement, use, and disposal with logical connections. Good (3): Creates a mostly accurate and clear map showing the main stages of the school water journey. Developing (2): Creates a basic map showing some stages, but important connections or elements are missing. Needs Support (1): Produces an incomplete or unclear map that does not adequately represent the school water system. <u>Criterion 3 – Identification of Conservation Opportunities</u> Excellent (4): Identifies several relevant sources of water waste and proposes realistic, specific, and sustainable conservation actions. Good (3): Identifies relevant water-waste issues and proposes generally appropriate conservation actions. Developing (2): Identifies some water-waste issues, but proposed actions are vague, limited, or difficult to implement. Needs Support (1): Demonstrates limited ability to identify water waste or propose appropriate conservation measures. <u>Criterion 4 – Integration of Digital Tools</u> Excellent (4): Uses Canva, Google Drawings, or digital devices confidently and effectively to create a clear, visually engaging, and informative water journey presentation. Good (3): Uses digital tools appropriately and creates a generally clear and informative digital output. Developing (2): Uses digital tools with some support; the digital output is basic or only partially communicates the findings. Needs Support (1): Demonstrates limited use of digital tools or produces an incomplete or unclear digital output.
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	<u>Criterion 5 – Collaboration & Communication</u> Excellent (4): All group members participate actively, share responsibilities effectively, and communicate findings clearly, confidently, and collaboratively. Good (3): Most group members participate and work collaboratively; findings are communicated clearly with minor weaknesses. Developing (2): Participation is uneven and communication of findings lacks clarity or organisation in some areas. Needs Support (1): Shows limited teamwork, participation, or communication; the group presentation is unclear or incomplete.
Methodology / application	The teacher introduces the evaluation criteria before the 60–80 minute investigation. Throughout the preparation, school exploration, diagram creation, and presentation phases, the teacher monitors student engagement and progress. Assessment data is gathered from observation worksheets, water journey diagrams, digital outputs, and group presentations to provide constructive formative feedback.
Inclusion and accessibility	The evaluation framework accommodates low-resource environments by relying primarily on observation and inexpensive materials, making it highly adaptable for disadvantaged schools. If outdoor access is limited, alternative adaptations such as indoor water analysis or school floor plan evaluations are supported.
Digital tools / resources	● Canva (for designing digital water flow diagrams or awareness posters) ● Google Drawings (for collaborative water system maps) ● Smartphones or tablets (for documentation) ● Padlet (optional for sharing findings)
Expected outcomes / usefulness	The tool provides educators with a clear framework to assess water-related systems thinking and resource management within an environment-based learning (EBL) context, fostering active environmental responsibility among students.

Learning Unit 1: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Save water at our school

Group: _____

Class: _____

Date: _____

1. Our water journey

Show how water moves through the school.

Water source → Where it is used → Where it goes

Examples:

- Taps
- Toilets
- Canteen
- Garden
- Cleaning areas

2. What did we discover?

Write 2–3 findings from your investigation.

- _____
- _____
- _____

3. Where is water being wasted?

Identify possible water waste or inefficient use.

Problem 1: _____

Problem 2: _____

Problem 3: _____

4. How can we save water?

Suggest three realistic solutions.

- _____
- _____
- _____

5. Our water pledge

Complete the sentence:

"Our group promises to _____ to help save water."

Canva design suggestion

Use water-drop icons, arrows, taps, school buildings, recycling/sustainability symbols, short sentences, photos, and simple flow diagrams. Keep the infographic visually clear and easy to read.

Learning Unit 2: Designing Inclusive STEM Learning Activities through Environment-Based Learning

Learning Unit 2 focuses on assessing learners' participation and progress in inclusive Environment-Based Learning (EBL) activities, ensuring that different needs, abilities and backgrounds are recognised throughout the evaluation process. The Evaluation Methods and Tools support teachers in assessing STEM learning through flexible, accessible and learner-centred approaches.

Through observation rubrics, assessment tools, logbooks and portfolios, educators can evaluate participation, collaboration, inquiry and problem-solving skills, environmental awareness and practical STEM competences. Particular attention is given to inclusive assessment, allowing learners to demonstrate their progress and achievements in different ways according to their abilities, strengths and learning needs.

Learning Unit 2: Evaluation Tool 1 Eco-Art: How can Nature's palette inspire sustainable art?

Field	Evaluation Tool Information
Target group	Teachers
Type of evaluation tool	Competence Assessment Rubric and Observation Sheet
Evaluation objective	To assess students' active participation, scientific inquiry in pigment extraction, creative artistic expression, collaboration within heterogeneous teams, understanding of sustainable/zero-waste practices, and ability to communicate an environmental message through art.
Competences / skills assessed	<u>STEM / Arts competences:</u> Inquiry and pigment extraction techniques, scientific observation of organic matter, artistic composition, color mixing, and creative visual expression. <u>Environmental competences:</u>

	Deep awareness of organic resource lifecycle, appreciation for bio-friendly alternatives to chemical pollutants, and commitment to zero-waste practices. <u>Digital competences:</u> Digital documentation of experimental extraction stages and collaborative online sharing on platforms like Padlet. <u>Transversal competences:</u> Teamwork, inclusive participation, appreciation for diverse creative perspectives, critical thinking, and social responsibility through environmental art activism.
Tool description	This observation rubric enables teachers to monitor and formatively assess student performance throughout the Eco-Art activity. It focuses on the student's engagement in collecting and crushing organic materials, their artistic execution using natural pigments, their team collaboration, and the clarity of the sustainability message in their final artwork. The tool tracks learning progress, supports inclusive participation, and generates structured qualitative feedback.
Evaluation criteria / indicators	<u>Criterion 1: Participation, Material Collection & Preparation</u> 4 – Actively collects diverse natural materials/waste and demonstrates outstanding engagement in all preparatory steps. 3 – Participates regularly in collection and preparation with minimal guidance. 2 – Contributes to material preparation but requires consistent prompting or assistance. 1 – Rarely participates or shows interest in collecting and preparing materials. <u>Criterion 2: Scientific Inquiry & Pigment Extraction</u> 4 – Methodically crushes and filters organic materials to extract clear, high-quality liquid pigments; experiments effectively with color intensity. 3 – Extracts functional pigments with minor support and follows basic safety/cleanliness steps. 2 – Extracts pigments but the process is disorganized, or results are incomplete. 1 – Shows little or no engagement in the extraction process. <u>Criterion 3: Artistic Expression & Eco-Friendly Medium Experimentation</u> 4 – Demonstrates high creativity and skillful composition using non-traditional natural mediums and eco-friendly textures.

3 – Effectively uses the extracted watercolors to paint a neat and coherent artwork.

2 – Creates artwork but shows limited experimentation with the natural paints or textures.

1 – Demonstrates severe difficulty or low effort in using the natural paints.

Criterion 4: Delivery of Environmental / Sustainability Message

4 – The final artwork delivers an exceptionally powerful, clear, and inspiring message about waste reduction, biodiversity, or environmental action.

3 – The artwork conveys a clear and appropriate environmental theme.

2 – The environmental message is vague, weak, or partially developed.

1 – The artwork lacks any clear connection to sustainability or conservation.

Criterion 5: Collaboration, Inclusion & Role Rotation

4 – Cooperates flawlessly, respects all viewpoints, supports peers, and executes assigned group roles brilliantly to ensure inclusive participation.

3 – Collaborates effectively and shares responsibilities evenly within the group.

2 – Participates in the group work but occasionally creates friction or requires teacher mediation.

1 – Struggles significantly to collaborate or blocks peers from participating.

Criterion 6: Communication & Exhibition Presentation

4 – Presents the team's "Eco-Masterpiece" confidently and clearly, explaining the scientific and artistic choices perfectly.

3 – Communicates findings and artistic choices adequately during class presentations.

2 – Presents findings with limited clarity, organization, or team involvement.

1 – Unable or unwilling to participate in communicating the group's outcomes.

Criterion 7: Digital Documentation (Padlet Submission)

4 – Consistently uploads clear, step-by-step photos of extraction, the final poster, and reflective captions to the Padlet wall.

3 – Uploads appropriate final artwork and basic process photos regularly.

	2 – Submits incomplete or late digital contributions on Padlet. 1 – Provides no digital documentation or portfolio submission.
Methodology / application	The teacher shares and discusses the rubric criteria with the class before starting the collection process. Throughout the extraction and art phases, the teacher observes individual and group workflows. Assessment data is gathered from direct sensory interaction, checking student planning sheets, listening to the final presentation, and inspecting the team's Padlet gallery portfolio. Formative feedback is delivered directly to groups at the end of the school exhibition to encourage reflection.
Inclusion and accessibility	This assessment focuses on creative effort, continuous progress, and team participation rather than pure technical artistic perfection or advanced vocabulary. Multiple non-textual pathways of showing knowledge are embraced—such as tactile mixing, visual design, and oral defense. Group roles (Collector, Extractor, Designer, Presenter) allow neurodivergent or disadvantaged learners to contribute where their personal strengths lie. In cases of zero digital access, handwritten planning sheets and physical display boards replace Padlet scoring fully.
Digital tools / resources	● Padlet (Online Gallery), Smartphones or tablets for photo/video documentation, Canva (for accompanying digital labels/signs, optional). ● Natural Pigment Extraction Cards, Eco-Art Planning Sheets, Group Padlet Records, School Eco-Art Exhibition layouts.
Expected outcomes / usefulness	This tool: ● Provides a structured matrix for tracking art-science (STEAM) integrated competencies. ● Promotes zero-waste practices and environmental empathy through sensory exploration. ● Empowers low-resource schools to implement rich, low-cost formative assessment. ● Enhances self-esteem and collaboration among marginalized or kinesthetic learners.

Learning Unit 2: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - Teacher Observation Sheet (Eco-Art)

- Student/Group Name: _____
- Date(s) of Observation: _____
- Teacher: _____

Evaluation Criterion	Observed Consistently (4)	Observed Often (3)	Observed Sometimes (2)	Observed Rarely (1)	Comments/Evidence
Actively collects organic waste and local plant materials	☐	☐	☐	☐	
Follows crushing and filtering procedures safely to make paint	☐	☐	☐	☐	
Experiments creatively with natural colors and textures	☐	☐	☐	☐	
Focuses group artwork on a clear sustainability/conservation theme	☐	☐	☐	☐	
Shares materials and responsibilities fairly with teammates	☐	☐	☐	☐	
Supports an inclusive team environment and values others' ideas	☐	☐	☐	☐	
Explains the science of plant pigments during the presentation	☐	☐	☐	☐	

Evaluation Criterion	Observed Consistently (4)	Observed Often (3)	Observed Sometimes (2)	Observed Rarely (1)	Comments/Evidence
Contributes process photos and artwork to the shared Padlet wall	☐	☐	☐	☐	

- Strengths Observed: _____
- Areas for Further Development: _____
- Teacher Feedback: _____

Overall Performance Level:

- ☐ Excellent (mostly 4s)
- ☐ Good (mostly 3s)
- ☐ Developing (mostly 2s)
- ☐ Needs Additional Support (mostly 1s)

Learning Unit 2: Evaluation Tool 2

Which soil helps plants grow better?

Field	Evaluation Tool Information
Target group	Teachers / Educators / Youth workers
Type of evaluation tool	Competence Assessment Rubric and Observation Sheet
Evaluation objective	To assess students' participation, inquiry skills, observation and data-recording abilities, understanding of soil quality and plant growth, collaboration within heterogeneous groups, and ability to draw evidence-based conclusions during the investigation of different soil types and their impact on plant development.
Competences / skills assessed	<u>STEM competences</u> • Inquiry and experimentation skills

	● Observation and scientific investigation skills ● Problem-solving skills in environmental contexts <u>Environmental competences</u> ● Understanding the role of soil in supporting plant life and biodiversity ● Awareness of sustainable environmental practices and natural resource management <u>Digital competences</u> ● Basic use of digital tools for documenting observations and sharing findings <u>Transversal competences</u> ● Collaboration and teamwork ● Inclusive participation and respect for diverse perspectives ● Communication and critical thinking skills ● Responsibility and active engagement in environmental issues
Tool description	This observation rubric enables teachers to monitor and assess student performance throughout the two-week investigation. It focuses on learners' participation in the inquiry process, quality of observations, collaborative engagement, environmental understanding and communication of findings. The rubric supports formative assessment and provides constructive feedback while promoting inclusion and active participation.
Evaluation criteria / indicators	<u>Criterion 1: Participation and Engagement</u> 4 – Actively participates throughout all stages of the investigation and consistently contributes to group tasks. 3 – Participates regularly and contributes to most group activities. 2 – Participates occasionally and requires encouragement. 1 – Rarely participates or engages in group activities. <u>Criterion 2: Scientific Observation and Data Recording</u> 4 – Records detailed, accurate and systematic observations using appropriate measurements and descriptions. 3 – Records mostly accurate observations with minor omissions. 2 – Records limited observations with several missing details. 1 – Records very few observations or incomplete information. <u>Criterion 3: Inquiry and Investigation Skills</u> 4 – Makes thoughtful predictions, asks relevant questions and uses evidence effectively.

	3 – Demonstrates satisfactory inquiry skills and uses some evidence. 2 – Shows limited inquiry skills and relies on minimal evidence. 1 – Demonstrates little engagement in inquiry processes. <u>Criterion 4: Understanding of Soil Quality and Plant Growth</u> 4 – Clearly explains how soil characteristics affect plant growth and biodiversity using evidence from the investigation. 3 – Explains the relationship between soil and plant growth with some supporting evidence. 2 – Demonstrates partial understanding of the concepts. 1 – Demonstrates limited understanding of the concepts. <u>Criterion 5: Collaboration and Inclusion</u> 4 – Works exceptionally well with others, supports peers and promotes inclusive participation. 3 – Collaborates effectively and respects group members. 2 – Participates in teamwork but requires occasional support. 1 – Experiences difficulties collaborating with peers. <u>Criterion 6: Communication of Findings</u> 4 – Presents findings clearly, confidently and uses evidence to support conclusions. 3 – Communicates findings adequately with some supporting evidence. 2 – Presents findings with limited clarity or supporting evidence. 1 – Has difficulty communicating findings and conclusions. <u>Criterion 7: Digital Documentation (if applicable)</u> 4 – Consistently uploads relevant photos, observations and reflections that enrich the investigation. 3 – Uploads appropriate documentation regularly. 2 – Provides limited digital contributions. 1 – Provides little or no digital documentation.
Methodology / application	The teacher introduces the rubric before the activity begins. During the two-week investigation, the teacher observes students individually and within their groups. Evidence is collected through direct observation, science notebooks, observation sheets, group discussions, presentations and Padlet contributions. The rubric is completed at the end of the activity. Feedback is provided to students individually or in groups to support reflection and future learning.

Inclusion and accessibility	Assessment focuses on progress, participation and engagement rather than solely on academic performance. Multiple forms of evidence are accepted, including oral explanations, visual records, photographs and written observations. Students with different abilities can demonstrate learning through differentiated roles within the group. Observation sheets may be simplified or supported with visual cues. The rubric values collaboration, effort and participation to ensure equitable assessment opportunities for disadvantaged learners.
Digital tools / resources	● Padlet ● Smartphone or tablet for photo documentation ● Digital observation journals (optional) ● Google Classroom or equivalent platform (optional) ● Teacher observation sheet ● Student science notebooks ● Observation worksheets ● Plant growth journals ● Padlet records with photos, observations, reflections ● Student presentation materials
Expected outcomes / usefulness	This tool: ● Provides teachers with a structured yet practical tool for formative assessment. ● Encourages active participation and inquiry-based learning. ● Supports the development of STEM and environmental competences. ● Promotes inclusion and collaborative learning. ● Helps learners reflect on their scientific investigation process and environmental understanding. ● Generates evidence of learning that can be used for feedback and continuous improvement.

Learning Unit 2: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - Teacher Observation Sheet

Student/Group Name: _____
 Date(s) of Observation: _____
 Teacher: _____

Evaluation Criterion	Observed Consistently (4)	Observed Often (3)	Observed Sometimes (2)	Observed Rarely (1)	Comments/Evidence
Actively participates in group activities and discussions	☐	☐	☐	☐	
Contributes to planting, monitoring and caring for the experiment	☐	☐	☐	☐	
Makes predictions and asks relevant scientific questions	☐	☐	☐	☐	
Observes plant growth carefully and systematically	☐	☐	☐	☐	
Records observations accurately in notebook/worksheet	☐	☐	☐	☐	
Uses measurements and evidence appropriately	☐	☐	☐	☐	
Demonstrates understanding of how soil affects plant growth	☐	☐	☐	☐	
Connects findings to biodiversity and environmental sustainability	☐	☐	☐	☐	
Collaborates respectfully with group members	☐	☐	☐	☐	
Supports inclusive participation and listens to others' ideas	☐	☐	☐	☐	
Shares ideas and findings clearly during discussions	☐	☐	☐	☐	
Contributes photos, observations or reflections to Padlet (if used)	☐	☐	☐	☐	

Strengths Observed

Areas for Further Development

Teacher Feedback

Overall Performance Level:

- ☐ Excellent (mostly 4s)
- ☐ Good (mostly 3s)
- ☐ Developing (mostly 2s)
- ☐ Needs Additional Support (mostly 1s)

Learning Unit 2: Evaluation Tool 3

How can native plants help us create a Pollinator-Friendly School Garden?

Field	Evaluation Tool Information
Target group	Teachers / Educators / Youth workers
Type of evaluation tool	Observation Logbook and Field Recording Tool
Evaluation objective	To support students in systematically recording observations of native plants and pollinators, documenting biodiversity within the school garden and reflecting on the ecological importance of plant–pollinator interactions.
Competences / skills assessed	<u>STEM competences</u> ● Observation and data collection skills ● Inquiry and research skills ● Recording and organising field observations <u>Environmental competences</u> ● Understanding biodiversity ● Awareness of pollinator conservation ● Knowledge of native plant species <u>Digital competences</u> ● Digital documentation of findings ● Use of collaborative digital tools <u>Transversal competences</u> ● Collaboration and teamwork ● Communication skills ● Environmental responsibility ● Critical thinking
Tool description	This field observation logbook allows students to record information about native plants and pollinators observed in the school garden. Learners document their observations, identify plant species and pollinators, and reflect on the ecological relationships they observe. The logbook supports inquiry-based learning and provides evidence of students' participation and environmental understanding.

Evaluation criteria / indicators	● Accurate identification of native plants ● Accurate identification of pollinators ● Quality and completeness of observations ● Participation in group activities ● Understanding of the role of pollinators ● Understanding of biodiversity concepts ● Contribution to the creation and maintenance of the pollinator-friendly garden
Methodology / application	Students work in groups and complete the observation logbook during the implementation and follow-up phases of the activity. Observations are recorded while investigating native plants, preparing plant information sheets and monitoring pollinator activity in the school garden. The completed logbooks are discussed within groups and may be uploaded to the shared Padlet as part of the project documentation.
Inclusion and accessibility	The logbook uses simple and structured observation fields that can be adapted according to students' age and learning needs. Visual supports, photographs and simplified recording formats may be provided when needed. Students contribute according to their strengths and can participate through observation, recording, photographing or presenting findings. The tool can be used in both digital and printed formats.
Digital tools / resources	● Padlet ● Smartphones or tablets for photo documentation ● Digital or printed Plant Investigation Sheets ● Plant Investigation Sheet ● Native Plant Identification Guide ● Pollinator Identification Guide ● Shared Padlet Wall ● Photographic Records
Expected outcomes / usefulness	This tool: ● Supports systematic observation and recording skills. ● Encourages active engagement with biodiversity. ● Promotes awareness of pollinator conservation. ● Provides evidence of student participation and learning. ● Supports inquiry-based and environment-based learning. ● Encourages collaborative investigation and reflection.

Learning Unit 2: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - Plant and Pollinator Field Observation Logbook

Group Name: _____

Date: _____

Native Plant Observed	Pollinator Observed	What did we observe?	Why is this important for biodiversity?

Reflection Questions

- Which native plants did we identify?
- Which pollinators did we observe?
- How do pollinators help plants reproduce?
- Why are native plants important for biodiversity?
- What did we learn from creating a pollinator-friendly school garden?

Learning Unit 2: Evaluation Tool 4

Eco-Odyssey: Reimagining Homer's Islands through STEM, Biodiversity and Sustainable Design

Field	Evaluation Tool Information
Target group	Teachers / Educators

Type of evaluation tool	STEM Project Portfolio and Teacher Assessment Rubric
Evaluation objective	To evaluate students' ability to investigate biodiversity through literary and environmental inquiry, analyse environmental information, develop sustainable solutions using engineering design thinking, and communicate their findings through collaborative digital products.
Competences / skills assessed	Environmental competences (biodiversity awareness, ecosystem understanding and sustainability), STEM competences (scientific inquiry, problem-solving and engineering design thinking), digital competences (digital mapping, multimedia creation and information management), literacy competences (interpretation of literary texts and communication) and transversal competences (collaboration, creativity, critical thinking and active citizenship).
Tool description	Students compile an Eco-Odyssey STEM Portfolio documenting each stage of their inquiry, including biodiversity investigation, environmental mapping, sustainable redesign proposals and digital products. The completed portfolio provides authentic evidence of interdisciplinary learning, while the teacher evaluates the portfolio using a dedicated assessment rubric.
Evaluation criteria / indicators	● Accuracy of biodiversity investigation ● Quality of environmental observations ● Scientific accuracy of collected information ● Quality of environmental data analysis ● Sustainability of proposed solutions ● Creativity and feasibility of the redesign proposal ● Effective use of digital tools ● Collaboration and communication ● Quality of the final portfolio
Methodology / application	Students progressively complete the Eco-Odyssey STEM Portfolio throughout the activity by documenting biodiversity investigations, environmental observations, mapping activities, redesign proposals and digital products. The teacher evaluates the completed portfolio using the assessment rubric, while peer discussion and reflection support formative assessment during project presentations.
Inclusion and accessibility	The portfolio is designed to be accessible to all learners through flexible ways of documenting evidence, including written texts, drawings, maps, photographs and digital products. Students may

	contribute according to their strengths and interests, while teachers can adapt instructions, provide visual supports or offer printed alternatives to ensure meaningful participation for all learners and school contexts.
Digital tools / resources	● Google Earth, ● Google My Maps ● Canva, Padlet ● Microsoft Excel or Google Sheets (optional) ● QR Code Generator (optional) ● Eco-Odyssey STEM Portfolio template ● Teacher Assessment Rubric ● Biodiversity Investigation Sheet ● Eco-Mapping Sheet ● Sustainable Island Blueprint template ● Padlet wall (optional).
Expected outcomes / usefulness	The Eco-Odyssey STEM Portfolio provides authentic evidence of students' scientific inquiry, environmental understanding, engineering design thinking, digital competence and collaborative learning. It supports both formative and summative assessment while documenting students' interdisciplinary learning process.

Learning Unit 2: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Eco-Odyssey Stem Portfolio

Student(s): _____

Group: _____

Class: _____

Date: _____

Part 1 – Homeric Biodiversity Investigation

Homeric location: _____

Native plants identified:

Native animals identified:

Ecological importance of the species:

Part 2 – Eco-Mapping

Environmental observations

- ☐ Biodiversity hotspots identified
- ☐ Human impacts recorded
- ☐ Ecosystem characteristics described

Main findings

Part 3 – Sustainable Island Redesign

Our proposed environmental improvements

- ☐ Native plant restoration
- ☐ Pollinator-friendly habitats
- ☐ Water conservation
- ☐ Habitat protection
- ☐ Other:

Justification

Part 4 – Final Digital Product

- ☐ Digital Story
- ☐ Comic
- ☐ Podcast

- ☐ Presentation
- ☐ Padlet
- ☐ Other

Part 5 – Group Reflection

What did we learn about biodiversity through the Odyssey?

How can our ideas contribute to a more sustainable environment?

What was my contribution to the group?

Teacher Assessment Checklist

- ☐ Scientific accuracy
- ☐ Biodiversity investigation
- ☐ Environmental understanding
- ☐ Sustainability of proposed solutions
- ☐ Creativity
- ☐ Digital competence
- ☐ Collaboration
- ☐ Communication
- ☐ Overall quality of the Eco-Odyssey STEM Portfolio

Learning Unit 2: Evaluation Tool 5

Bio-Blitz poster

Field	Evaluation Tool Information
Target group	8–10 / 11–14 Students (working in small groups)

Type of evaluation tool	Teacher observation rubric + Biodiversity investigation portfolio + Group assessment
Evaluation objective	To evaluate the scientific observation and mathematical thinking evidenced in a group's biodiversity poster, and in the process by which the group arrived at it, rather than in the appearance of the poster itself. The intention is to capture what students can do with real data they have gathered from their own school grounds.
Competences / skills assessed	<u>STEM:</u> Scientific observation, classification of findings into categories, tallying, calculation of totals and percentages, selection and construction of an appropriate chart, and comparison between two micro-habitats. <u>Transversal:</u> Teamwork, contribution to an assigned role, and communication of findings to an audience. <u>Environmental:</u> Recognition of biodiversity indicators and of signs of human impact within a familiar local setting.
Tool description	Three to five criteria are agreed with the class before the survey begins, using wording the students themselves have helped to phrase. The poster each group produces at the end of the activity is then reviewed against the agreed criteria using a simple assessment scale adapted to the learners' age and needs. The practical assessment materials provided below offer a four-level scale (Excellent / Good / Satisfactory / Needs improvement), which teachers may simplify or adapt where appropriate. Alongside each rating the teacher records one short sentence of evidence drawn from the poster or from the group's presentation of it, so that the rating is always anchored to something the students actually did. The criteria may vary depending on how the Bio-Blitz has been adapted for the class.
Evaluation criteria / indicators	Whether the observation checklist was completed systematically across the group's assigned area.

	● Whether the findings are sorted into categories and tallied, rather than simply listed. ● Whether a calculation has been carried out and whether the result is used on the poster rather than just displayed. ● Whether the chart matches the data it represents and is labelled clearly enough for another group to read. ● Whether the group draws any comparison between areas, habitats or between nature and signs of human impact. ● Whether the proposed biodiversity action is specific, achievable within the school, and traceable to something the group found. ● Movement across successive EBL activities, which is more informative than any single poster.
Methodology / application	1. Agree three to five criteria with the class before going outdoors and display them where groups can see them while they work. 2. Model one criterion using an example unconnected to the survey, so that the scale is understood before it is applied to science or mathematics. 3. Circulate during the survey and the classroom data stage, noting briefly where a group is making decisions about how to record or count. These notes support the later ratings. 4. Review each completed poster against the agreed criteria, recording one sentence of evidence for each rating. 5. Give each group one strength and one question during their short presentation, phrased as a question rather than a correction wherever possible. 6. Repeat with the same criteria after the next EBL activity and keep the completed sheets together, so that the sequence rather than the single rating becomes the evidence of progress.
Inclusion and accessibility	The criteria and the rating scale can be icon-based, so neither the students nor the reviewer depend on reading. Because the review is of the group's poster, students whose contribution was drawing, counting or laying out are credited on the same footing as those who wrote or presented. Depth of calculation is not fixed. A group that has worked out the proportion of spaces containing plants can rate as highly as a

	group that has produced a more complex analysis, provided the reasoning holds. Where a group has surveyed a smaller or simpler area, the same criteria still apply, so no group is disadvantaged by the section it was allocated. Evidence may be spoken. Where a group can explain something that is not visible on the poster, that explanation counts.
Digital tools / resources	• None are required, as the review is designed to be paper-based and completed alongside the activity. Where students have photographed species or habitat features, those images may be treated as part of the poster evidence. Calculators may be used at the data stage. • A free, downloadable bio-blitz planning guide is available from National Geographic Education: https://education.nationalgeographic.org/resource/do-it-yourself-bioblitz/
Expected outcomes / usefulness	The review gives teachers evidence of scientific and mathematical competence drawn from a real investigation on the school's own grounds, in a form that takes little additional time to complete. Because the criteria are agreed in advance and phrased with the class, students understand what is being looked for and can work towards it during the activity rather than after it. For students who show little movement in conventional test scores, a sequence of poster reviews across a term provides accessible and credible evidence of progression, and the posters themselves are readily shown to parents, school leadership or the wider school community.

Learning Unit 2: Evaluation Tool 5

Practical assessment materials

MATERIAL 1 – Bio-Blitz observation and assessment checklist

Student / Group: _____

Date: _____

Area / microhabitat observed: _____

Evaluation criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Observes the assigned area carefully and systematically	☐	☐	☐	☐	
Identifies and records relevant biodiversity indicators	☐	☐	☐	☐	
Records signs of human impact where relevant	☐	☐	☐	☐	
Classifies observations into appropriate categories	☐	☐	☐	☐	
Organises and represents collected data clearly	☐	☐	☐	☐	
Compares findings between different microhabitats	☐	☐	☐	☐	
Collaborates effectively with group members	☐	☐	☐	☐	
Uses evidence to propose an action to support biodiversity	☐	☐	☐	☐	

Teacher comments

Strengths observed:

Areas for improvement:

Overall performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

MATERIAL 2 – Bio-Blitz findings and action sheet

Group: _____

Area investigated: _____:

Date: _____

1. What did we observe?

Biodiversity indicator	Number / tally	Notes
Plants / flowers		
Insects		
Birds		
Other organisms		
Signs of human impact		

2. What does our data show?

Which area or microhabitat showed the greatest biodiversity?

What differences did we observe between the areas?

What signs of human impact did we identify?

3. Represent your findings

Use a tally chart, bar chart, pie chart, percentages or another appropriate format to represent your results.

4. Our biodiversity action

Based on our evidence, what action could help improve biodiversity in our school?

Why do we think this action would help?

5. Group reflection

One thing we learned about biodiversity:

One thing that surprised us:

One action we could realistically take:

Learning Unit 2: Evaluation Tool 6

Water detectives review

Field	Evaluation Tool Information
Target group	8–10 / 11–14
Type of evaluation tool	Investigation data sheet + assessment rubric + water-saving action plan + peer evaluation
Evaluation objective	To evaluate whether students can turn a measurement they have taken themselves into a recommendation they can defend. The focus is on whether the mathematics is used rather than merely performed, and on whether the group can trace its proposed action back to its own data.
Competences / skills assessed	<u>STEM:</u> Measurement and estimation of flow rate, calculation of averages and totals, unit conversion, comparison against a benchmark figure, and evidence-based reasoning from a number to a decision. <u>Transversal:</u> Collaboration, contribution to an assigned role, giving and receiving peer feedback, and communication of a proposal. <u>Environmental:</u> understanding of the water footprint of everyday activity and confidence in proposing realistic conservation measures within the school.
Tool description	Before the investigation begins, the class agrees three to five success criteria for what makes a good water-saving action plan. These are phrased by the students, typically along the lines of: ● Someone reading it would know what to do ● Our school could actually do it ● We can show the numbers that made us say it Each group's completed plan is then reviewed twice against those same criteria, first by another group and then by the teacher. Where the two reviews disagree, the disagreement is

	discussed rather than resolved by the teacher alone. The value of the instrument lies largely in that conversation, which obliges students to point back at their own data. The practical assessment materials provided below support this process by combining a water investigation data sheet, an assessment rubric and a water-saving action plan with peer feedback and final reflection.
Evaluation criteria / indicators	• Whether the flow rate is stated with the unit attached, rather than as a bare number. • Whether the estimate for a school day can be traced back to the group's own measurement and to the reference figures they were given. • Whether the proposed action names a specific change rather than a general intention. • Whether the group can say how they would check, afterwards, whether the action had worked. • Degree of agreement between the peer review and the teacher review, as an indicator of how well the criteria are understood. • Movement across successive EBL activities, which is the primary indicator and more informative than any single plan.
Methodology / application	1. Agree three to five success criteria with the class before the investigation begins and display them for the duration of the activity. 2. Model the criteria using a weak example plan, so that students can identify what is missing before they are asked to judge each other's work. 3. Circulate during the measurement and calculation stages, noting where a group is making a decision about how to measure or what to count. These notes support the later review. 4. Groups exchange plans and review one another's against the agreed criteria, recording one strength and one suggestion. Allow five to ten minutes and circulate. 5. Review each plan yourself against the same criteria, then return both reviews to the group and discuss only the criteria where the two differ. 6. Each group identifies one thing they would add or change before the plan went to the school, and says what they would need in order to do it. Note any support requested repeatedly across the class.

Inclusion and accessibility	• The criteria are phrased by the students in their own words, which removes the barrier of assessment language and makes peer review workable across attainment levels. • Groups that used teacher-provided sample data, rather than measuring a tap directly, are reviewed against exactly the same criteria, so no group is disadvantaged by its school's facilities. • Because calculation roles are differentiated within each group, the review looks at the group's product, and students with lower mathematical confidence are not separated out. • Peer feedback uses sentence starters and is limited to one strength and one suggestion, which keeps the exchange manageable and prevents it becoming critical. • Where peer review is unsuitable for a particular group, the peer step can be replaced by a short conversation with the teacher without altering the instrument.
Digital tools / resources	• None are required, as the review is designed to be paper-based. Where groups have used a spreadsheet to record results or generate a chart, that output may be treated as part of the plan. The free online Water Footprint Calculator (www.watercalculator.org) may be used where groups are comparing their findings against average figures. • A reference sheet of typical water-use figures and a free online water footprint calculator are available from the Water Footprint Calculator website: https://watercalculator.org/resource/teaching-conservation-with-water-footprint-calculator/ • Existing peer and self-assessment instruments are available free from the NAAEE eeVAL methods library: https://evaluation.naaee.org/resources/methods-library
Expected outcomes / usefulness	The instrument makes visible whether students are using their measurements or simply reporting them, which is difficult to see from a completed worksheet alone. Agreeing the criteria in advance gives students something concrete to work towards during the activity, and the peer review step obliges them to articulate reasoning they might otherwise leave implicit. Over a sequence of EBL activities the reviews accumulate into an accessible record of whether students are becoming more confident at moving from data to decision, which is a form of progress that conventional assessment in mathematics rarely

	captures and which is straightforward to show to parents or school leadership.
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Learning Unit 2: Evaluation Tool 6

Practical assessment materials

MATERIAL 1 – Water investigation data sheet

ECOTEACH – LU2 / Evaluation Tool 6

Related Hands-On Exercise: Water Detectives

Group: _____

Date: _____

Area investigated: _____

Water flow measurements

Location / tap	Water collected	Time measured	Calculated flow rate	Observations
1.				
2.				
3.				
4.				
5.				

Analysing our data

1. Which location had the highest water flow?

2. Which location had the lowest water flow?

3. Did we identify any possible unnecessary water use or water waste?

- ☐ Yes
☐ No
☐ We are not sure

Explain using evidence from your measurements:

4. Which finding surprised us most?

5. What does our investigation tell us about water use in our school?

MATERIAL 2 – Water Detectives assessment rubric

Student / Group: _____ - _____

Teacher / Educator: _____

Date: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Carries out water measurements carefully and appropriately	☐	☐	☐	☐	
Records investigation data clearly and accurately	☐	☐	☐	☐	

Performs relevant calculations correctly	☐	☐	☐	☐	
Compares and interprets water-use data	☐	☐	☐	☐	
Identifies potential water waste using evidence	☐	☐	☐	☐	
Participates actively and collaborates with the group	☐	☐	☐	☐	
Proposes realistic water-saving actions	☐	☐	☐	☐	
Connects proposed actions with the collected evidence	☐	☐	☐	☐	
Communicates findings and proposals clearly	☐	☐	☐	☐	

Overall score

Total score: ____ / 36

Teacher feedback

Strengths

Areas for improvement

MATERIAL 3 – Water-saving action plan

Group: _____

School / Area: _____

Date: _____

1. What did our investigation show?

Our most important finding:

Evidence supporting this finding:

2. Where could water be saved?

Location / situation:

Problem identified:

Evidence from our investigation:

3. Our proposed actions

Proposed action	Why is it needed?	Evidence supporting it	Who could implement it?	Is it feasible?
1.				☐ Yes ☐ Partly ☐ No
2.				☐ Yes ☐ Partly ☐ No
3.				☐ Yes ☐ Partly ☐ No

4. Selecting our priority action

Which action should be implemented first?

Why?

How could this action reduce water consumption or waste?

How could we check whether this action has worked?

5. Peer feedback

Group reviewing our plan: _____

Our proposed actions are:

Clear:

☐ Yes ☐ Partly ☐ Not yet

Realistic:

☐ Yes ☐ Partly ☐ Not yet

Supported by data:

☐ Yes ☐ Partly ☐ Not yet

One strength of the action plan:

One suggestion for improvement:

6. Final group reflection

After receiving feedback, is there anything we would change in our plan?

One thing we learned about water conservation:

One action we can personally take to reduce water waste:

Learning Unit 3: Integrating Mathematics and STEM Content into EBL

Learning Unit 3 focuses on assessing learners' ability to integrate Mathematics and STEM knowledge into Environment-Based Learning (EBL), using real environmental contexts as opportunities for measurement, data analysis, reasoning and problem-solving. The Evaluation Methods and Tools support educators in assessing both the application of STEM concepts and the learning process.

Through rubrics, observation tools, self-assessment and practical evaluation methods, educators can assess mathematical reasoning, data collection and interpretation, problem-solving, collaboration and the application of STEM knowledge to environmental challenges. Particular attention is given to learners' ability to connect mathematical and scientific concepts with real-world situations and reflect on their learning process.

Learning Unit 3: Evaluation Tool 1 Measuring water waste at school

Field	Evaluation Tool Information
Target group	11–14
Type of evaluation tool	Environmental Audit Report and Teacher Assessment Checklist
Evaluation objective	To evaluate students' ability to collect and analyse quantitative data on water consumption, apply mathematical reasoning, interpret evidence, identify water waste and develop realistic recommendations for improving water conservation within the school environment.
Competences / skills assessed	<u>STEM competences:</u> Volume measurement, data collection and analysis, mathematical reasoning, proportional thinking, interpretation of quantitative information and evidence-based problem-solving. <u>Environmental competences:</u>

	Awareness of water conservation, sustainable use of natural resources and responsible environmental decision-making. <u>Digital competences:</u> Organisation and visualisation of data using digital tools and creation of digital awareness materials. <u>Transversal competences:</u> Collaboration, communication, critical thinking, decision-making and active citizenship.
Tool description	Students complete a School Water Audit Report documenting each stage of the investigation. The report includes water measurements, mathematical calculations, tables, graphs, analysis of water consumption patterns and evidence-based recommendations for reducing water waste. The completed report serves as authentic evidence of learning and is assessed using a teacher assessment checklist.
Evaluation criteria / indicators	● Accuracy of water measurements ● Correct mathematical calculations ● Organisation and presentation of collected data ● Quality of graphs and data visualisation ● Interpretation of water consumption patterns ● Feasibility of proposed water-saving actions ● Collaboration during the investigation ● Overall quality of the School Water Audit Report
Methodology / application	Students progressively complete the School Water Audit Report throughout the activity by recording measurements, organising mathematical calculations, preparing tables and graphs, analysing water consumption patterns and proposing practical water-conservation actions. The teacher evaluates the completed report using the assessment checklist, while group discussions and presentations support formative assessment.
Inclusion and accessibility	The School Water Audit Report provides structured recording templates and multiple ways of presenting evidence, including measurements, tables, graphs, written explanations and visual materials. Students contribute according to their strengths and assigned roles, while teachers may provide visual supports, simplified recording sheets or printed alternatives to ensure meaningful participation for all learners and school contexts.
Digital tools / resources	● Microsoft Excel or Google Sheets, Padlet, Canva, Smartphone or tablet for photo documentation.

	School Water Audit Report template, Teacher Assessment Checklist, Measurement Recording Sheet, Microsoft Excel or Google Sheets (optional), Padlet wall, Canva awareness campaign materials.
Expected outcomes / usefulness	The School Water Audit Report provides authentic evidence of students' mathematical reasoning, environmental understanding and collaborative inquiry. It supports both formative and summative assessment while encouraging evidence-based decision-making for sustainable water management.

Learning Unit 3: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - School water audit report

School: _____

Group: _____

Members: _____

Date: _____

Part 1 – Water Measurements

School Tap	5 sec (mL)	10 sec (mL)	15 sec (mL)
Tap 1			
Tap 2			
Tap 3			

Part 2 – Mathematical Analysis

- ✓ Total volume calculated
- ✓ Average water flow calculated
- ✓ Unit conversions completed (mL ↔ L)
- ✓ Tables completed
- ✓ Graphs created

Part 3 – Water Waste Analysis

Which tap releases the largest amount of water?

What evidence supports your conclusion?

Part 4 – Water Conservation Recommendations

Our group recommends:

- ☐ Repair leaking taps
- ☐ Install push-button/sensor taps
- ☐ Place awareness posters
- ☐ Reduce unnecessary water use
- ☐ Regular maintenance
- ☐ Other:

Explain your recommendations.

Part 5 – Every Drop Counts Campaign

What awareness material did your group create?

- ☐ Poster
- ☐ Infographic
- ☐ Digital Presentation
- ☐ Padlet Post
- ☐ Other

Part 6 – Final Recommendation to the School

Write one evidence-based recommendation that could help reduce water waste in your school.

Teacher Assessment Checklist

- ☐ Accurate measurements
- ☐ Correct mathematical calculations
- ☐ Clear data organisation
- ☐ Appropriate use of tables and graphs
- ☐ Evidence-based interpretation
- ☐ Realistic water conservation recommendations
- ☐ Effective teamwork
- ☐ Overall quality of the School Water Audit Report

Learning Unit 3: Evaluation Tool 2

How can our school save energy? (Measuring and saving energy at school)

Field	Evaluation Tool Information
Target group	Teachers / Educators
Type of evaluation tool	School Energy Action Plan and Teacher Assessment Checklist
Evaluation objective	To evaluate students' ability to investigate energy consumption, analyse quantitative data, interpret evidence, identify opportunities for improving energy efficiency and develop realistic action plans that promote sustainable energy use within the school community.
Competences / skills assessed	<u>STEM competences:</u> Energy measurement, data collection and analysis, mathematical reasoning, interpretation of quantitative information, evidence-based problem-solving. <u>Environmental competences:</u> Awareness of energy conservation, sustainable resource management, climate responsibility and environmental decision-making. <u>Digital competences:</u> Data organisation and visualisation, digital communication and creation of awareness materials. <u>Transversal competences:</u>

	Collaboration, communication, critical thinking, planning, decision-making and active citizenship.
Tool description	Students develop a School Energy Action Plan based on the findings of their energy audit. The action plan documents the evidence collected, identifies priority areas for improvement and proposes realistic actions to reduce energy consumption. The completed action plan serves as authentic evidence of students' mathematical reasoning, environmental understanding and collaborative problem-solving and is evaluated using a teacher assessment checklist.
Evaluation criteria / indicators	● Accuracy of energy measurements ● Correct mathematical calculations and data interpretation ● Organisation and presentation of collected evidence ● Identification of priority energy issues ● Feasibility of the proposed actions ● Quality of the Energy Action Plan ● Collaboration and participation ● Communication of recommendations.
Methodology / application	Students progressively develop the School Energy Action Plan throughout the activity by recording measurements, organising data, analysing energy consumption patterns and identifying realistic strategies for improving energy efficiency. The teacher evaluates the completed action plan using the assessment checklist, while group discussions and presentations support formative assessment.
Inclusion and accessibility	The School Energy Action Plan provides structured templates and multiple ways of presenting evidence, including measurements, tables, graphs, written recommendations and visual materials. Students contribute according to their strengths and assigned roles, while teachers may adapt recording templates, provide visual supports or offer printed alternatives to ensure meaningful participation for all learners and school contexts.
Digital tools / resources	● Microsoft Excel or Google Sheets, Padlet, PowerPoint or Google Slides, Smartphone or tablet for photo documentation.

	School Energy Action Plan template, Teacher Assessment Checklist, Energy Measurement Recording Sheet, Microsoft Excel or Google Sheets (optional), Padlet wall, School Energy Saving Guide, PowerPoint or Google Slides presentation template.
Expected outcomes / usefulness	The School Energy Action Plan provides authentic evidence of students' mathematical reasoning, environmental understanding and collaborative planning. It supports both formative and summative assessment while encouraging evidence-based decision-making and long-term sustainable energy practices within the school community.

Learning Unit 3: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - School Energy Action Plan

School: _____

Group: _____

Members: _____

Date: _____

Part 1 – Energy Audit Summary

Classroom(s) investigated:

Main measurements collected:

- ☐ Temperature
☐ Lighting conditions
☐ Electricity use
☐ Other:

Part 2 – Key Findings

What did your investigation reveal?

Part 3 – Priority Energy Issues

Identify the main energy-saving priorities for your school.

- ☐ Lights left on unnecessarily
- ☐ Heating used inefficiently
- ☐ Windows left open
- ☐ Electrical devices left on standby
- ☐ Poor use of natural daylight
- ☐ Other:

Part 4 – Proposed Energy-Saving Actions

List the actions your group recommends.

Action	Expected	Benefit

Part 5 – Expected Impact

How will these actions improve energy efficiency and sustainability at your school?

Part 6 – Action Timeline

Action	When?	Responsible

Part 7 – Our Commitment

As a team, we commit to supporting energy-saving practices by:

Teacher Assessment Checklist

- ☐ Accurate collection of energy data
- ☐ Correct mathematical calculations and data interpretation
- ☐ Identification of priority energy issues
- ☐ Realistic and feasible action plan
- ☐ Evidence-based recommendations
- ☐ Effective teamwork
- ☐ Clear communication of findings
- ☐ Overall quality of the School Energy Action Plan

Learning Unit 3: Evaluation Tool 3
**Measuring and redesigning a sustainable
 schoolyard**

Field	Evaluation Tool Information
Target group	11–14
Type of evaluation tool	Project Portfolio and Teacher Assessment Rubric

Evaluation objective	To evaluate students' ability to collect and analyse real-world measurements, calculate areas and percentages, interpret data, and develop a sustainable schoolyard redesign proposal that addresses environmental needs through mathematical reasoning and collaborative problem-solving.
Competences / skills assessed	STEM: Measurements in a real-world environment, observation and drawing conclusions, designing a sustainable schoolyard, using digital tools, understanding the relationship between humans and the environment
Tool description	Students compile a Project Portfolio documenting each stage of the activity. The portfolio includes the measurement tables, area and percentage calculations, data visualisations, redesign sketches or digital models, and the final sustainable schoolyard proposal. The teacher evaluates the completed portfolio using a project assessment rubric, while a short student reflection is included at the end to encourage self-assessment and metacognition.
Evaluation criteria / indicators	Teacher Evaluation Criteria ● Accuracy of measurements ● Accuracy of area calculations ● Correct use of fractions and percentages ● Organisation and interpretation of data ● Quality and feasibility of the redesign proposal ● Environmental justification ● Creativity ● Collaboration ● Communication of findings
Methodology / application	Students compile a Project Portfolio throughout the activity, including field measurements, mathematical calculations, data tables, charts and the final sustainable schoolyard redesign proposal. The teacher evaluates the completed portfolio using the assessment rubric. At the end of the activity, students complete a short reflection sheet to encourage self-reflection and metacognitive thinking.
Inclusion and accessibility	The Project Portfolio is designed to be accessible to all learners through clear instructions, structured recording templates and flexible ways of documenting evidence. It can be completed using either digital or printed materials,

	allowing adaptation to different learning needs, levels of digital competence and school contexts. Where needed, teachers may provide visual supports, simplified instructions or other appropriate accommodations to ensure meaningful participation for all students.
Digital tools / resources	• Computers or tablets, Microsoft Excel or Google Sheets for data organisation and visualisation, SketchUp for Schools or Tinkercad (optional) for designing the sustainable schoolyard. • Project Portfolio template, Measurement recording sheet, Graph paper, Microsoft Excel or Google Sheets (optional), SketchUp for Schools or Tinkercad (optional), Paper and pens.
Expected outcomes / usefulness	The completed Project Portfolio provides evidence of students' mathematical reasoning, environmental understanding, collaborative work and problem-solving skills, while the reflection sheet supports self-evaluation and metacognitive awareness.

Learning Unit 3: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - Sustainable Schoolyard Design Project Portfolio

This portfolio documents each stage of the Sustainable Schoolyard Design project. It gathers the evidence produced by the group throughout the activity and supports both formative and summative assessment.

- Group: _____
- School: _____
- Date: _____

1. Field Measurements

- Total schoolyard area: _____
- Green area: _____

2. Mathematical Calculations

- ☐ Area calculations completed
- ☐ Fraction calculations completed
- ☐ Percentage calculations completed

3. Data Presentation

- ☐ Measurement Table
- ☐ Bar Chart / Pie Chart

4. Sustainable Schoolyard Redesign

- Describe the main improvements your group proposed:

5. Environmental Justification

- How will your redesign improve the school environment?

- ☐ More green spaces
- ☐ Better biodiversity
- ☐ More shade
- ☐ Improved quality of life
- ☐ Other: _____

- Brief explanation: _____

6. Group Reflection

- What mathematical concepts did we apply? _____
- What did we learn about sustainable school design? _____
- What was our group's most important contribution? _____

7. Analytical Teacher Assessment Rubric

Evaluation Criterion	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Mathematical Accuracy & Area Calculations	All field measurements and area calculations are perfectly accurate. Fractions and percentages are applied correctly without errors.	Area calculations are mostly accurate with 1-2 minor mathematical slips. Fractions and percentages are well understood.	Measurements or area calculations contain multiple errors. Proportional and percentage reasoning is weak.	Calculations are incorrect, incomplete, or missing. Basic mathematical concepts were not applied.

Evaluation Criterion	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Data Organisation & Visualisation	Tables and charts (digital/manual) are flawlessly organized, highly clear, and correctly structured.	Data is presented clearly in tables and charts with only minor labeling or formatting issues.	Tables or charts are partially complete, messy, or difficult to interpret.	Data presentation is chaotic, incomplete, or entirely missing from the portfolio.
Redesign Proposal Quality & Feasibility	The proposal (sketch/digital model) is outstandingly creative, realistic, and highly detailed.	The redesign plan is well thought out, feasible, and addresses the space limitations appropriately.	The proposal is vague, lacks critical design elements, or is unrealistic for the school space.	The redesign proposal lacks effort, detail, or clear structure.
Environmental Justification & Sustainability	Provides a deep, evidence-based justification linking the design to biodiversity, shade, and climate resilience.	Clearly explains how the changes improve the environment (e.g., green spaces, shade) with minor details missing.	Environmental justification is superficial or fails to connect with sustainability themes.	No environmental reasoning or justification is provided in the portfolio.
Teamwork & Collaboration	Flawless group cooperation. Responsibilities were shared democratically, ensuring total inclusive participation.	Group members worked effectively together and shared tasks evenly.	Teamwork was functional but faced minor friction or unequal work distribution.	Group struggled significantly to collaborate, or specific students were excluded.

Learning Unit 3: Evaluation Tool 4

How can we represent Nature using scale?

Field	Evaluation Tool Information
Target group	Teacher/Educator/ Youth worker
Type of evaluation tool	Authentic Assessment Package: Measurement Chart, Student Self-Assessment and Teacher Rubric
Evaluation objective	To evaluate students' understanding of scale, measurement and proportional reasoning, together with their collaboration,

	environmental awareness and application of mathematical concepts in authentic contexts.
Competences / skills assessed	● Mathematical reasoning ● Measurement and proportional thinking ● Biodiversity identification ● Collaboration ● Digital competence ● Environmental awareness
Tool description	The measurement and rating table used by the students during the activity is initially considered the primary, authentic tool for evaluating their performance. To evaluate their final performance, students select responses on a 5-point linear scale (not at all / a little / somewhat / very / extremely) by answering the following 5 self-assessment questions: 1) I understood the scale conversion process for drawing an object, 2) I understood the use of proportions to create enlarged or reduced representations, 3) I understood the usefulness of mathematics in observing and studying the natural environment, 4) I collaborated with my team to collect, organize, and record data, 5) I understood the function and use of the Canva app. The same questions, using the same rating scale, can also be included in the rubric, which the teacher will complete for each student. The rubric for the poster will include an assessment of the accuracy of the measurements, as well as the quality of the presentation and the team's collaboration.
Evaluation criteria / indicators	● Accuracy of measurements ● Correct application of scale ● Organisation of collected data ● Poster quality ● Team collaboration ● Understanding of biodiversity
Methodology / application	Students complete the self-assessment questionnaire either digitally using Google Forms or in printed form. The teacher reviews the students' responses together with the completed Measurement Chart and the final poster, using the assessment rubric to evaluate students' understanding of scale,

	measurement, collaboration and the application of mathematical concepts throughout the activity
Inclusion and accessibility	The evaluation tool is designed to be accessible to all learners through the use of simple multiple-choice questions and clear language. It can be completed either digitally using Google Forms or in printed format, allowing flexibility for different learning needs, levels of digital competence and school contexts. Where needed, the tool can be further adapted through visual supports, simplified instructions or other appropriate accessibility accommodations to ensure meaningful participation for all students.
Digital tools / resources	● Google Forms ● Computers or tablets ● Printed self-assessment questionnaire (optional) ● Measurement Chart ● Poster assessment rubric ● Printer and paper (optional)
Expected outcomes / usefulness	The expected outcomes of completing this self-assessment questionnaire, as well as the rubric, are to provide the teacher with information regarding the degree and level to which the originally set objectives (knowledge, skills, attitudes, values) have been achieved. In other words, to assess the extent to which students understood the mathematical concepts of proportions and scaling (enlargement/reduction), collaborated, used digital tools, and engaged with local biodiversity.

Learning Unit 3: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Student Self-Assessment Questionnaire

Please rate your experience for each statement using the following 5-point scale:

1 = Not at all | 2 = A little | 3 = Somewhat | 4 = Very | 5 = Extremely

Reflection Statement	1	2	3	4	5
1. I understood the scale conversion process for drawing an object.	☐	☐	☐	☐	☐

Reflection Statement	1	2	3	4	5
2. I understood the use of proportions to create enlarged or reduced representations.	☐	☐	☐	☐	☐
3. I understood the usefulness of mathematics in observing and studying the natural environment.	☐	☐	☐	☐	☐
4. I collaborated effectively with my team to collect, organize, and record data.	☐	☐	☐	☐	☐
5. I understood the function and use of the Canva app (or physical layout alternatives).	☐	☐	☐	☐	☐

MATERIAL 2 - Teacher Observation & Poster Rubric

Evaluation Criterion	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Accuracy & Scale Application	Measurements are perfectly accurate. Scale conversions (enlargements/reductions) are correct with no mathematical errors.	Measurements are mostly accurate. Scale conversions are correct with only 1-2 minor mathematical slips.	Measurements have several errors. Proportional scaling is attempted but contains significant conversion mistakes.	Scale conversions are incorrect or missing entirely; dimensions do not match the real leaf samples.
Data Organisation (Chart)	The Measurement Chart is flawlessly organized, systematically fully completed, and clear.	The Measurement Chart is fully completed with minor organizational or labeling issues.	The Measurement Chart is partially complete; data is unorganized or hard to follow.	The chart is incomplete, chaotic, or not used during the investigation.
Poster Quality & Presentation	The poster (Canva or Canson) is outstandingly clear, creative, and neatly labeled with actual/scaled dimensions and species details.	The poster is clean, clear, and includes the required legends and descriptions with minor missing visual elements.	The poster is messy or lacks clear scaling legends and structural descriptions.	The poster lacks effort, missing essential leaf representations, scales, or text.
Team Collaboration	Group members rotated roles smoothly, shared responsibilities democratically, and fully supported inclusive participation.	Group members worked well together, shared most tasks evenly, and respected	Teamwork was functional but faced unequal division of labor or minor friction;	Team struggled significantly to cooperate, or specific members were excluded from participating.

Evaluation Criterion	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
		diverse perspectives.	required teacher prompting.	
Biodiversity Awareness	Demonstrates deep understanding of leaf species, their role in the local ecosystem, and links to climate resilience.	Correctly identifies plant species and notes basic facts about their ecological importance.	Provides limited or superficial descriptions of plant biodiversity and sustainability.	Fails to identify species or link the natural elements to environment

Learning Unit 4: Digital Tools and Resources for Enhancing EBL in STEM

Learning Unit 4 focuses on assessing learners' effective and responsible use of digital tools and resources within Environment-Based Learning (EBL) in STEM education. The Evaluation Methods and Tools support educators in assessing how learners use technology to collect, analyse, interpret and communicate environmental information while developing digital and STEM competences.

Through rubrics, observation tools, self-assessment and practical evaluation methods, educators can assess digital literacy, data analysis, scientific inquiry, problem-solving and communication skills. Particular attention is given to learners' ability to select and use digital tools appropriately, interpret environmental data and apply technology in meaningful, collaborative and sustainability-oriented ways.

Learning Unit 4: Evaluation Tool 1 Climate change data detectives assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Data analysis rubric + Teacher assessment + Student reflection
Evaluation objective	To assess students' ability to investigate and interpret real climate data using reliable digital sources, identify long-term temperature and precipitation trends, create and analyse graphs, and develop evidence-based conclusions about climate change and its possible effects on their local environment. The evaluation also assesses students' ability to use digital tools effectively, collaborate during the investigation and communicate scientific findings clearly through data, visual representations and digital presentations.
Competences / skills assessed	<u>STEM competences</u> Scientific inquiry

	● Data interpretation ● Mathematical reasoning ● Graph analysis ● Evidence-based problem solving <u>Environmental competences</u> ● Climate literacy ● Sustainability awareness ● Environmental responsibility ● Critical understanding of climate change <u>Digital competences</u> ● Searching reliable scientific databases ● Working with spreadsheets ● Creating digital charts ● Organising and interpreting digital data ● Presenting digital results <u>Transversal competences</u> ● Critical thinking ● Teamwork ● Communication ● Problem solving ● Digital collaboration
Tool description	This evaluation tool supports teachers in assessing students throughout the Climate Change Data Detectives activity. Students work in small collaborative groups to investigate authentic climate datasets from their local region, using historical temperature and precipitation records from reliable environmental databases. They organise the collected information in spreadsheets, create graphs, identify climate trends and discuss possible environmental impacts on their community. The assessment focuses on the accuracy and organisation of climate data, interpretation of graphs and trends, effective use of digital tools, evidence-based reasoning, teamwork and communication of scientific findings. The tool supports both formative assessment during the investigation and summative assessment of the groups' final conclusions and digital presentation.
Evaluation criteria / indicators	<u>Criterion 1 – Climate Data Collection and Organisation</u> 4 – Excellent; collects complete, accurate and relevant temperature and precipitation data from reliable scientific sources and organises it clearly and systematically.

- 3 – Good; collects appropriate climate data and organises it correctly, with only minor omissions or inaccuracies.
 2 – Satisfactory; collects basic climate data but requires teacher guidance to select, organise or verify the information.
 1 – Needs Improvement; collects limited, inaccurate or poorly organised climate data and requires substantial support.

Criterion 2 – Graph Creation and Data Representation

- 4 – Excellent; creates accurate, clear and well-organised graphs that effectively represent climate data and facilitate comparison of temperature and precipitation trends.
 3 – Good; creates appropriate and understandable graphs with only minor errors or organisational weaknesses.
 2 – Satisfactory; creates basic graphs but requires support to represent or label the data correctly.
 1 – Needs Improvement; graphs are incomplete, inaccurate or difficult to interpret.

Criterion 3 – Climate Trend Analysis and Interpretation

- 4 – Excellent; accurately identifies significant climate trends and provides well-supported interpretations based on the analysed data.
 3 – Good; correctly identifies the main climate trends and provides appropriate interpretations with minor omissions.
 2 – Satisfactory; identifies some basic trends but requires guidance to interpret their significance.
 1 – Needs Improvement; shows significant difficulty identifying or interpreting climate trends.

Criterion 4 – Use of Digital Tools

- 4 – Excellent; uses environmental databases, spreadsheets and digital presentation tools confidently, independently and effectively throughout the investigation.
 3 – Good; uses digital tools appropriately with occasional teacher support.
 2 – Satisfactory; uses basic digital functions but requires regular assistance.
 1 – Needs Improvement; shows significant difficulties using the digital tools required for the activity.

Criterion 5 – Evidence-Based Conclusions and Environmental Understanding

- 4 – Excellent; develops clear and scientifically justified conclusions connecting climate data with possible local

	environmental changes and proposes realistic mitigation or adaptation actions. 3 – Good; develops appropriate conclusions supported by data and identifies relevant environmental implications or actions. 2 – Satisfactory; provides basic conclusions but makes limited connections between the evidence, climate change and local environmental impacts. 1 – Needs Improvement; provides unsupported or incomplete conclusions and demonstrates limited understanding of the relationship between climate data and environmental change. <u>Criterion 6 – Collaboration and Communication</u> 4 – Excellent; collaborates actively and responsibly with peers and communicates findings clearly using accurate scientific language, graphs and well-organised digital resources. 3 – Good; participates positively in group work and communicates the main findings clearly. 2 – Satisfactory; participates inconsistently or requires support to communicate findings effectively. 1 – Needs Improvement; shows limited participation in collaborative work or significant difficulties communicating the results.
Methodology / application	The teacher introduces and discusses the assessment rubric before students begin the Climate Change Data Detectives investigation. During the activity, students work in small groups to access reliable climate databases, collect historical temperature and precipitation data, organise the information in spreadsheets and create digital graphs. The teacher observes the investigation process and provides formative feedback on data selection, organisation, digital competence, collaboration and interpretation. Students then analyse the graphs, identify relevant climate trends and develop evidence-based conclusions about possible environmental changes in their local area. Each group presents its findings and proposes local actions that could contribute to climate change mitigation or adaptation. The final assessment combines teacher observation, the quality and accuracy of the climate dataset and graphs, students' interpretation of climate trends, their evidence-based conclusions and the quality of the final presentation.

Inclusion and accessibility	The evaluation tool supports inclusive participation by allowing students to assume different roles according to their abilities and strengths, such as data researcher, spreadsheet organiser, graph creator, climate analyst or presenter. Teachers may provide simplified datasets, partially completed spreadsheets, visual instructions, graph templates and step-by-step digital guidance when required. Peer support and collaborative group work can help learners who experience difficulties with mathematical reasoning, digital technologies or written communication. Students may communicate their conclusions through different formats, including oral presentations, digital slides, posters, graphs or short written reports. Printed materials and offline datasets can also be provided where access to digital technologies or internet connectivity is limited.
Digital tools / resources	● Copernicus Climate Data Store ● Copernicus Browser ● AEMET Open Climate Data ● Google Sheets / Microsoft Excel ● Canva ● Google Slides ● Copernicus Climate Data Store ● Climate Data Analysis Assessment Sheet ● Student Climate Investigation Reflection Sheet
Expected outcomes / usefulness	The tool enables teachers to assess students' ability to use authentic environmental data as scientific evidence for understanding climate change. It supports the development of climate literacy, mathematical and scientific reasoning, data interpretation and digital competence while encouraging students to connect global climate processes with observable changes in their local environment. The evaluation also promotes collaborative inquiry, critical thinking and responsible environmental citizenship by encouraging learners to move from climate data analysis to evidence-based conclusions and practical local responses.

Learning Unit 4: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - Climate data analysis assessment sheet

Activity: Climate change data detectives

Evaluation Tool: DIS-EVAL-LU4-HO1

Student / Group: _____

Date: _____

Teacher: _____

Assessment Criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)	Comments / Evidence
Climate data are accurate, relevant and obtained from reliable sources	☐	☐	☐	☐	
Temperature and precipitation data are clearly organised	☐	☐	☐	☐	
Graphs represent the collected climate data accurately	☐	☐	☐	☐	
Climate trends are correctly identified and interpreted	☐	☐	☐	☐	
Digital tools are used effectively	☐	☐	☐	☐	
Conclusions are supported by scientific evidence	☐	☐	☐	☐	
Local environmental impacts are appropriately considered	☐	☐	☐	☐	
Proposed mitigation or adaptation actions are relevant and realistic	☐	☐	☐	☐	
Team collaboration is effective	☐	☐	☐	☐	
Final findings are communicated clearly	☐	☐	☐	☐	

Teacher Summary

Strengths observed

Areas for improvement

Overall Performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs Improvement

MATERIAL 2 - Student climate investigation reflection sheet

Student: _____

Activity: Climate change data detectives

1. What was the most important climate trend identified by your group?

2. What evidence from the climate data supports this conclusion?

3. Which digital tool did you use the most?

- ☐ Copernicus Climate Data Store / Copernicus Browser
- ☐ AEMET Open Climate Data
- ☐ Google Sheets / Microsoft Excel
- ☐ Canva
- ☐ Google Slides
- ☐ Other: _____

4. What was the most difficult part of analysing the climate data?

5. What possible environmental change in your local area could be related to the climate trends you observed?

6. What local action would you propose to help mitigate or adapt to climate change?

7. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs Improvement

8. Self-assessment

Statement	Yes	Partly	No
I actively participated in the investigation	☐	☐	☐
I helped collect or organise climate data	☐	☐	☐
I understand the graphs we created	☐	☐	☐
I can identify climate trends using scientific data	☐	☐	☐
I used digital tools appropriately	☐	☐	☐
I contributed to our conclusions	☐	☐	☐
I understand better how climate change can affect my local environment	☐	☐	☐

Learning Unit 4: Evaluation Tool 2

Smart biodiversity mapping assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Field observation rubric + Digital product assessment + Student reflection

Evaluation objective	To assess students' ability to investigate local biodiversity through direct environmental observation and digital tools, accurately document species and habitats, organise environmental information and contribute to the creation of a collaborative digital biodiversity map. The evaluation also assesses students' scientific observation skills, responsible use of digital technologies, environmental awareness, teamwork and ability to communicate biodiversity findings clearly and accurately.
Competences / skills assessed	<u>STEM competences</u> ● Scientific observation and inquiry ● Species identification and classification ● Environmental data collection ● Evidence interpretation ● Spatial reasoning <u>Environmental competences</u> ● Biodiversity awareness ● Understanding of local ecosystems ● Recognition of species and habitats ● Environmental responsibility ● Awareness of human impacts on biodiversity <u>Digital competences</u> ● Digital documentation using photographs ● Use of digital mapping tools ● Geolocation of environmental observations ● Organisation and presentation of digital information ● Responsible use of digital technologies <u>Transversal competences</u> ● Teamwork and collaboration ● Critical thinking ● Communication ● Problem solving ● Environmental citizenship
Tool description	This evaluation tool supports teachers in assessing students throughout the Smart biodiversity mapping activity. Students work collaboratively to explore the school grounds or a nearby natural area, observe local biodiversity and document selected species and habitats using photographs, notes and digital tools. The collected information is organised and geolocated to create a collaborative digital biodiversity map.

	The assessment focuses on the quality and accuracy of field observations, species documentation, appropriate use of digital mapping tools, understanding of biodiversity and local ecosystems, teamwork and communication of findings. The tool supports both formative assessment during the field investigation and summative assessment of the final collaborative biodiversity map.
Evaluation criteria / indicators	<u>Criterion 1 – Field observation and biodiversity data collection</u> 4 – Excellent; conducts careful and systematic observations, collecting accurate, relevant and well-organised information about local species and habitats. 3 – Good; collects appropriate biodiversity information through effective observation, with only minor omissions or inaccuracies. 2 – Satisfactory; collects basic biodiversity information but requires guidance to improve observation or documentation. 1 – Needs improvement; collects limited, inaccurate or poorly organised information and requires substantial support. <u>Criterion 2 – Species identification and documentation</u> 4 – Excellent; identifies and documents species accurately using clear photographs, relevant information and appropriate identification resources. 3 – Good; identifies and documents most species appropriately, with only minor errors or incomplete information. 2 – Satisfactory; identifies some species but requires support with classification or documentation. 1 – Needs improvement; shows significant difficulty identifying or documenting observed species. <u>Criterion 3 – Digital biodiversity map</u> 4 – Excellent; creates accurate, well-organised and informative map contributions, correctly locating observations and presenting relevant biodiversity information clearly. 3 – Good; creates appropriate map contributions with accurate locations and generally clear information. 2 – Satisfactory; makes basic contributions to the map but requires support with geolocation, organisation or presentation. 1 – Needs improvement; map contributions are incomplete, inaccurate or difficult to interpret. <u>Criterion 4 – Use of digital tools</u>

	4 – Excellent; uses digital observation, identification, mapping and presentation tools confidently, responsibly and independently. 3 – Good; uses the required digital tools appropriately with occasional support. 2 – Satisfactory; uses basic digital functions but requires regular assistance. 1 – Needs improvement; shows significant difficulty using the digital tools required for the activity. <u>Criterion 5 – Understanding of biodiversity and environmental interpretation</u> 4 – Excellent; demonstrates a clear understanding of local biodiversity, habitats and ecological relationships and develops well-supported interpretations from the observations. 3 – Good; demonstrates appropriate understanding of biodiversity and identifies relevant relationships within the local ecosystem. 2 – Satisfactory; demonstrates basic understanding but requires guidance to interpret ecological relationships. 1 – Needs improvement; demonstrates limited understanding of biodiversity or the environmental significance of the observations. <u>Criterion 6 – Collaboration and communication</u> 4 – Excellent; collaborates actively and responsibly, contributes consistently to the group investigation and communicates biodiversity findings clearly and accurately. 3 – Good; participates positively in group work and communicates the main findings effectively. 2 – Satisfactory; participates inconsistently or requires support to communicate findings. 1 – Needs improvement; shows limited participation in collaborative work or significant difficulties communicating results.
Methodology / application	The teacher introduces the assessment rubric before beginning the Smart biodiversity mapping activity and explains the main criteria to students. Students work in small groups to explore the school grounds or a nearby natural environment, observe biodiversity and collect evidence through photographs, field notes and digital identification tools. They record relevant information about

	species and habitats and locate their observations using appropriate digital mapping tools. During the investigation, the teacher observes students' scientific inquiry, fieldwork, digital competence and collaboration and provides formative feedback. Students then organise their observations and contribute them to a collaborative digital biodiversity map. The final assessment combines teacher observation, the accuracy and quality of biodiversity records, appropriate use of digital tools, contribution to the collaborative map, environmental interpretation and communication of findings.
Inclusion and accessibility	The activity and assessment allow students to take different roles according to their abilities and preferences, including observer, photographer, species researcher, map editor, recorder or presenter. Teachers may provide simplified observation sheets, visual species guides, predefined categories, accessible digital tools and step-by-step instructions where necessary. Students who experience difficulties with written communication may document their observations using photographs, symbols, short audio recordings or oral explanations. Where outdoor access is limited, biodiversity observations may be conducted using photographs, previously collected data, school garden observations or virtual environmental resources. Collaborative work allows students to contribute according to their individual strengths while remaining actively involved in the assessment process.
Digital tools / resources	● iNaturalist ● Google My Maps ● Smartphone or tablet camera ● Google Sheets ● Padlet ● Canva / Google Slides ● Biodiversity mapping assessment sheet ● Student biodiversity reflection sheet
Expected outcomes / usefulness	The tool enables teachers to assess students' ability to combine environmental observation with digital technologies to investigate and represent local biodiversity.

	It supports the development of scientific inquiry, biodiversity awareness, digital literacy and spatial understanding while encouraging learners to recognise the ecological value of their immediate surroundings. The evaluation also promotes teamwork, responsible use of technology and environmental citizenship by transforming field observations into a collaborative digital resource that can be shared with the school community.
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Learning Unit 4: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - Biodiversity mapping assessment sheet

Activity: Smart biodiversity mapping

Evaluation tool: DIS-EVAL-LU4-HO2

Student / Group: _____

Date: _____

Teacher: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Field observations are systematic and relevant	☐	☐	☐	☐	
Species and habitats are appropriately identified	☐	☐	☐	☐	
Photographs and biodiversity records are clear and useful	☐	☐	☐	☐	
Observations are correctly located on the digital map	☐	☐	☐	☐	

Digital tools are used effectively and responsibly	☐	☐	☐	☐	
Biodiversity information is accurate and well organised	☐	☐	☐	☐	
Ecological relationships are appropriately interpreted	☐	☐	☐	☐	
Student contributes actively to the collaborative map	☐	☐	☐	☐	
Team collaboration is effective	☐	☐	☐	☐	
Final findings are communicated clearly	☐	☐	☐	☐	

Teacher summary

Strengths observed

Areas for improvement

Overall performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

MATERIAL 2 - Student biodiversity reflection sheet

Student: _____

Activity: Smart biodiversity mapping

1. Which species or habitat did you find most interesting during the investigation?

2. What did you learn about biodiversity in your school or local environment?

3. Which digital tool did you use the most?

- ☐ iNaturalist
- ☐ Google My Maps
- ☐ Smartphone / tablet camera
- ☐ Google Sheets
- ☐ Padlet
- ☐ Canva / Google Slides
- ☐ Other: _____

4. How did digital tools help you investigate or represent biodiversity?

5. Did you identify any environmental problem or threat affecting local biodiversity? Explain briefly.

6. What action could your school or community take to help protect local biodiversity?

7. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

8. Self-assessment

Statement	Yes	Partly	No
I actively participated in the field investigation	☐	☐	☐
I helped observe or document biodiversity	☐	☐	☐
I contributed to identifying species or habitats	☐	☐	☐
I used digital tools appropriately	☐	☐	☐
I contributed to the collaborative biodiversity map	☐	☐	☐
I understand better the biodiversity of my local environment	☐	☐	☐
I can identify actions that could help protect local biodiversity	☐	☐	☐

Learning Unit 4: Evaluation Tool 3

Air quality investigation assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Environmental data analysis rubric + Digital product assessment + Student reflection

Evaluation objective	To assess students' ability to investigate local air quality using digital environmental data, identify and interpret relevant pollution indicators, compare air quality conditions across locations or time periods and draw evidence-based conclusions about possible pollution sources and their environmental and health implications. The evaluation also assesses students' ability to use digital tools responsibly, represent environmental data clearly, apply scientific reasoning, collaborate with peers and communicate practical recommendations for improving local air quality.
Competences / skills assessed	<u>STEM competences</u> ● Scientific observation and inquiry ● Environmental data collection and analysis ● Interpretation of air quality indicators ● Identification of patterns and trends ● Evidence-based reasoning ● Problem solving <u>Environmental competences</u> ● Awareness of air pollution and air quality ● Recognition of local pollution sources ● Understanding of links between human activities and environmental quality ● Awareness of environmental and health impacts ● Development of environmentally responsible attitudes <u>Digital competences</u> ● Accessing digital environmental data ● Use of digital air quality monitoring resources ● Organisation and representation of data ● Creation and interpretation of graphs and visualisations ● Responsible use of digital information <u>Transversal competences</u> ● Critical thinking ● Teamwork and collaboration ● Communication ● Decision-making ● Environmental citizenship
Tool description	This evaluation tool supports teachers in assessing students throughout the Air quality detectives activity. Students investigate air quality in their local environment using digital monitoring platforms, environmental databases or available sensor data. Working collaboratively, they collect or consult information about relevant air quality indicators, compare data

	from different locations or time periods and identify patterns that may be related to traffic, urban activity, weather conditions or other possible pollution sources. Students organise and represent the information using digital tools and use the evidence collected to develop conclusions about local air quality. They then communicate their findings and propose realistic actions that could contribute to reducing air pollution or improving environmental awareness. The assessment combines teacher observation, analysis of the students' environmental data, the quality of their digital representation, scientific interpretation, teamwork and communication of conclusions and recommendations.
Evaluation criteria / indicators	<u>Criterion 1 – Air quality data collection and selection</u> 4 – Excellent; selects and records relevant, reliable and well-organised air quality data from appropriate digital sources. 3 – Good; selects appropriate air quality data and records it accurately, with only minor omissions. 2 – Satisfactory; collects basic air quality data but requires guidance to select, organise or understand relevant indicators. 1 – Needs improvement; collects limited, inaccurate or poorly organised data and requires substantial support. <u>Criterion 2 – Data representation and digital tools</u> 4 – Excellent; uses digital tools confidently to organise and represent air quality data through clear, accurate and informative graphs, tables, maps or other visualisations. 3 – Good; uses digital tools appropriately and creates generally clear and accurate representations of the data. 2 – Satisfactory; creates basic digital representations but requires support with organisation, accuracy or presentation. 1 – Needs improvement; shows significant difficulty using digital tools or representing the collected data. <u>Criterion 3 – Analysis and interpretation of air quality</u> 4 – Excellent; accurately identifies patterns, differences and relevant air quality indicators and develops well-supported interpretations based on the evidence. 3 – Good; identifies the main patterns and interprets most air quality information appropriately. 2 – Satisfactory; recognises some basic patterns but requires guidance to interpret their environmental significance.

	1 – Needs improvement; shows limited understanding of the data or draws conclusions that are not supported by the evidence. <u>Criterion 4 – Identification of pollution sources and impacts</u> 4 – Excellent; clearly connects observed air quality patterns with plausible local pollution sources and explains relevant environmental and health implications. 3 – Good; identifies appropriate pollution sources and demonstrates a general understanding of their possible impacts. 2 – Satisfactory; identifies some possible pollution sources but provides limited explanation of their effects. 1 – Needs improvement; shows significant difficulty identifying pollution sources or understanding their impacts. <u>Criterion 5 – Conclusions and proposed actions</u> 4 – Excellent; develops clear, evidence-based conclusions and proposes realistic, relevant and well-justified actions to improve air quality or environmental awareness. 3 – Good; develops appropriate conclusions and proposes relevant actions supported by the investigation. 2 – Satisfactory; provides basic conclusions or general recommendations with limited connection to the evidence. 1 – Needs improvement; provides unclear conclusions or recommendations that are not supported by the investigation. <u>Criterion 6 – Collaboration and communication</u> 4 – Excellent; collaborates actively and responsibly, contributes consistently to the investigation and communicates findings clearly using appropriate scientific and environmental information. 3 – Good; participates positively in group work and communicates the main findings effectively. 2 – Satisfactory; participates inconsistently or requires support to communicate the investigation results. 1 – Needs improvement; shows limited participation or significant difficulties communicating findings.
Methodology / application	The teacher introduces the assessment criteria before beginning the Air quality detectives activity and explains the main air quality indicators and digital resources that students will use. Students work individually or in small groups to access, collect or analyse air quality information from digital environmental

	monitoring sources. Depending on the available resources, they may compare different locations, different times of day or different periods and investigate possible relationships between air quality, traffic, weather conditions or other local factors. Students organise the collected information using tables, graphs, maps or other digital visualisations and identify significant patterns or differences. During the activity, the teacher observes students' use of digital tools, scientific reasoning, data interpretation and collaboration and provides formative feedback. The final assessment considers the quality of the collected data, its digital representation, interpretation of air quality indicators, identification of possible pollution sources and impacts, evidence-based conclusions, proposed actions and communication of findings.
Inclusion and accessibility	The activity allows students to take different roles according to their abilities and preferences, including data researcher, recorder, graph creator, environmental analyst or presenter. Teachers may provide simplified datasets, predefined air quality indicators, visual explanations, partially completed tables or graph templates and step-by-step instructions. Students who experience difficulties interpreting numerical data may work with visual scales, colour-coded air quality categories or simplified comparisons. Where access to digital monitoring platforms or sensors is limited, teachers may provide previously downloaded datasets or screenshots of air quality information for analysis. Students may communicate their findings through written text, oral presentations, visual posters, graphs or other accessible formats. Collaborative work enables all learners to contribute according to their individual strengths and learning needs.
Digital tools / resources	● Air quality monitoring platforms or datasets ● Google Sheets / Microsoft Excel ● Google Maps ● Canva – https://www.canva.com ● Google Slides – https://slides.google.com ● Google Drawings – https://docs.google.com/drawings ● Padlet – https://padlet.com

	● Google Workspace – https://workspace.google.com ● Air quality investigation assessment sheet ● Student air quality reflection sheet
Expected outcomes / usefulness	The tool enables teachers to assess students' ability to use digital environmental information to investigate a real and locally relevant environmental challenge. It supports the development of scientific inquiry, environmental data literacy, digital competence and critical thinking while helping learners understand the relationship between human activities, air pollution, environmental quality and health. The evaluation also encourages students to move beyond data interpretation by using evidence to formulate practical recommendations and communicate environmental information to others.

Learning Unit 4: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - Air quality investigation assessment sheet

Activity: Air quality detectives

Evaluation tool: DIS-EVAL-LU4-HO3

Student / Group: _____

Date: _____

Teacher: _____:

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Relevant air quality data are selected and recorded accurately	☐	☐	☐	☐	
Data sources and indicators are used appropriately	☐	☐	☐	☐	
Data are organised clearly	☐	☐	☐	☐	

Graphs, maps or visualisations represent the data accurately	☐	☐	☐	☐	
Important patterns or differences are identified	☐	☐	☐	☐	
Possible pollution sources are appropriately identified	☐	☐	☐	☐	
Environmental and health impacts are understood	☐	☐	☐	☐	
Conclusions are supported by evidence	☐	☐	☐	☐	
Proposed actions are realistic and relevant	☐	☐	☐	☐	
Group collaboration and communication are effective	☐	☐	☐	☐	

Teacher summary

Strengths observed

Areas for improvement

Overall performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

MATERIAL 2 - Student air quality reflection sheet

Student: _____

Activity: Air quality detectives

1. What was the most important thing you discovered about air quality in the area you investigated?

2. Which air quality indicator or data did you find most useful? Why?

3. What patterns or differences did you observe in the data?

4. What do you think could be causing these air quality conditions?

5. What possible effects could this air pollution have on people or the environment?

6. What action could your school or local community take to help improve air quality?

7. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

8. Self-assessment

Statement	Yes	Partly	No
I actively participated in the investigation	☐	☐	☐
I understand the air quality data we used	☐	☐	☐
I helped organise or represent the data	☐	☐	☐
I can identify possible sources of air pollution	☐	☐	☐
I can explain some effects of air pollution	☐	☐	☐

I contributed to the conclusions or recommendations	☐	☐	☐
I understand better how digital tools can be used to investigate environmental problems	☐	☐	☐

Learning Unit 4: Hands-On Exercise 4

Smart sustainable school project assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Project assessment rubric + Digital product assessment + Student reflection
Evaluation objective	To assess students' ability to identify sustainability challenges within their school environment and design realistic, innovative and evidence-based solutions using STEM knowledge and digital tools. The evaluation also assesses students' ability to integrate environmental, scientific, technological and design considerations into a sustainable school proposal, work collaboratively, justify their decisions and communicate their ideas effectively through digital representations and presentations.
Competences / skills assessed	<u>STEM competences</u> ● Problem-solving through STEM ● Design thinking ● Scientific and mathematical reasoning ● Application of STEM knowledge to real-world challenges ● Planning and evaluation of sustainable solutions <u>Environmental competences</u> ● Identification of school sustainability challenges ● Understanding of resource use and environmental impact ● Sustainable decision-making ● Environmental responsibility ● Development of practical sustainability solutions <u>Digital competences</u>

	● Use of digital design and presentation tools ● Creation of digital models, plans or visual representations ● Organisation and communication of information ● Responsible and purposeful use of technology ● Digital collaboration <u>Transversal competences</u> ● Creativity and innovation ● Teamwork and collaborative decision-making ● Critical thinking ● Problem-solving ● Communication and presentation skills
Tool description	This evaluation tool supports teachers in assessing students throughout the Design a smart sustainable school activity. Students work collaboratively to identify sustainability challenges in their school and develop a digital proposal for improving its environmental performance. Their solutions may address areas such as energy efficiency, water use, waste management, biodiversity, sustainable mobility or the use of school spaces. Using STEM knowledge and digital tools, students analyse the selected challenge, design realistic solutions and create a digital model, plan, infographic or presentation to communicate their proposal. The assessment focuses on understanding of the sustainability challenge, application of STEM knowledge, quality and feasibility of the proposed solutions, effective use of digital tools, creativity, teamwork and communication.
Evaluation criteria / indicators	<u>Criterion 1 – Identification and analysis of the sustainability challenge</u> 4 – Excellent; clearly identifies a relevant school sustainability challenge and provides a detailed, evidence-based analysis of its causes, impacts and importance. 3 – Good; identifies an appropriate sustainability challenge and provides a clear analysis with only minor gaps. 2 – Satisfactory; identifies a basic sustainability challenge but requires guidance to analyse its causes or environmental impacts. 1 – Needs improvement; the challenge is unclear, poorly defined or analysed with limited understanding. <u>Criterion 2 – Application of STEM knowledge</u>

- 4 – Excellent; applies relevant scientific, mathematical, technological or engineering concepts accurately and effectively to develop the proposed solution.
- 3 – Good; applies appropriate STEM concepts with only minor inaccuracies or omissions.
- 2 – Satisfactory; uses some relevant STEM concepts but requires support to apply them effectively.
- 1 – Needs improvement; demonstrates limited application or understanding of relevant STEM concepts.

Criterion 3 – Sustainability and feasibility of the proposed solution

- 4 – Excellent; proposes an innovative, realistic and well-justified solution with clear environmental benefits and strong potential for practical implementation.
- 3 – Good; proposes a relevant and feasible solution with appropriate environmental benefits.
- 2 – Satisfactory; proposes a basic solution but provides limited justification or consideration of feasibility.
- 1 – Needs improvement; the proposed solution is unclear, unrealistic or insufficiently connected to the identified sustainability challenge.

Criterion 4 – Digital design and use of technology

- 4 – Excellent; uses digital tools confidently and effectively to create a clear, accurate and engaging representation of the sustainable school proposal.
- 3 – Good; uses appropriate digital tools and creates a clear representation with only minor weaknesses.
- 2 – Satisfactory; creates a basic digital representation but requires support with organisation, design or use of technology.
- 1 – Needs improvement; shows significant difficulty using digital tools or presenting the proposed solution digitally.

Criterion 5 – Creativity and innovation

- 4 – Excellent; develops an original and thoughtful solution that demonstrates creativity while remaining relevant and realistic.
- 3 – Good; develops a creative and appropriate solution with some innovative elements.
- 2 – Satisfactory; develops a functional but relatively basic solution with limited originality.
- 1 – Needs improvement; the proposal demonstrates little creativity or does not adequately respond to the identified challenge.

	<u>Criterion 6 – Collaboration and communication</u> 4 – Excellent; collaborates actively and responsibly, contributes consistently to the project and communicates the proposal clearly, persuasively and using appropriate STEM and environmental terminology. 3 – Good; participates positively in group work and communicates the proposal clearly. 2 – Satisfactory; participates inconsistently or requires support to communicate the proposal effectively. 1 – Needs improvement; shows limited participation in collaborative work or significant difficulties communicating the project.
Methodology / application	The teacher introduces the assessment rubric before students begin the Design a smart sustainable school project and discusses the main assessment criteria with the class. Students work in small groups to investigate their school environment and identify a relevant sustainability challenge. They analyse the problem, discuss possible solutions and select one or more areas for improvement, such as energy, water, waste, biodiversity, mobility or sustainable use of school spaces. Groups then apply STEM knowledge and use digital tools to develop and represent their proposed solution. Depending on the activity and available resources, the final product may take the form of a digital school plan, model, infographic, presentation or other visual representation. During the project, the teacher observes collaboration, problem-solving, application of STEM knowledge and use of digital tools and provides formative feedback. The final assessment combines teacher observation with evaluation of the proposed sustainable solution, its scientific and environmental justification, feasibility, digital representation, creativity and final presentation.
Inclusion and accessibility	The project allows students to assume different roles according to their abilities, interests and strengths, including environmental researcher, data analyst, designer, digital creator, recorder or presenter.

	Teachers may provide visual examples, simplified project templates, predefined sustainability challenges, planning sheets and step-by-step digital guidance. Complex design tasks can be divided into smaller stages, and students may use accessible or low-tech alternatives where necessary. Students may communicate their sustainable school proposal through different formats, including oral presentations, posters, drawings, physical models, digital slides, infographics or simple digital designs. Where access to digital technologies is limited, paper-based plans or physical models can replace digital representations without affecting the main learning and evaluation objectives.
Digital tools / resources	● Canva ● Google Slides / Microsoft PowerPoint ● Google Drawings ● Google Maps / Google Earth ● Spreadsheet tools ● Digital design or modelling tools available in the school ● Smartphone, tablet or computer ● Digital design and presentation tools ● School maps, plans or photographs ● Environmental or resource-use data where available ● Smart sustainable school project assessment sheet ● Student sustainable school reflection sheet
Expected outcomes / usefulness	The tool enables teachers to assess students' ability to apply STEM knowledge, environmental awareness and digital competences to a practical sustainability challenge within their own school. It supports project-based and solution-oriented learning by assessing not only the final product but also investigation, decision-making, creativity, collaboration and the reasoning behind the proposed solutions. The evaluation encourages learners to see their school as a real environment for innovation and sustainability and to recognise how STEM knowledge and digital technologies can contribute to practical environmental improvements.

Learning Unit 4: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Smart sustainable school project assessment sheet

Activity: Design a smart sustainable school

Evaluation tool: DIS-EVAL-LU4-HO4

Student / Group: _____

Date: _____

Teacher: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
The sustainability challenge is clearly identified	☐	☐	☐	☐	
The problem is analysed using relevant evidence	☐	☐	☐	☐	
STEM knowledge is applied appropriately	☐	☐	☐	☐	
The proposed solution addresses the identified challenge	☐	☐	☐	☐	
The solution is sustainable and environmentally relevant	☐	☐	☐	☐	
The proposal is realistic and feasible	☐	☐	☐	☐	
Digital tools are used effectively	☐	☐	☐	☐	
The proposal demonstrates creativity and innovation	☐	☐	☐	☐	
Team collaboration is effective	☐	☐	☐	☐	
The final proposal is communicated clearly	☐	☐	☐	☐	

Teacher summary

Strengths observed

Areas for improvement

Overall performance

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

MATERIAL 2 - Student sustainable school reflection sheet

Student: _____

Activity: Design a smart sustainable school

1. What sustainability challenge did your group choose?

2. Why is this challenge important for your school?

3. What solution did your group propose?

4. Which STEM knowledge or skills did you use to develop your solution?

5. Which digital tools did you use and how did they help you develop or communicate your proposal?

6. What environmental benefits could your solution provide?

7. What would you change or improve if you developed the project again?

8. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

9. Self-assessment

Statement	Yes	Partly	No
I actively participated in the project	☐	☐	☐
I helped identify or analyse the sustainability challenge	☐	☐	☐
I contributed ideas to the proposed solution	☐	☐	☐
I applied STEM knowledge or skills	☐	☐	☐
I used digital tools appropriately	☐	☐	☐
I contributed to the final design or presentation	☐	☐	☐
I can explain why our proposal could make the school more sustainable	☐	☐	☐

Learning Unit 5: Community Engagement and Project-Based Learning in EBL

Learning Unit 5 focuses on assessing learners' participation and progress in community-based and project-based Environment-Based Learning (EBL), where environmental challenges are explored through collaborative action linked to the school and wider community. The Evaluation Methods and Tools support educators in assessing both the learning process and learners' contribution to meaningful local environmental initiatives.

Through rubrics, observation tools, self-assessment and participatory evaluation methods, educators can assess environmental awareness, STEM competences, collaboration, problem-solving, civic engagement and the development of practical solutions to local challenges. Particular attention is given to learners' ability to work with others, take responsibility, connect learning with their community and reflect on the environmental and social impact of their actions.

Learning Unit 5: Evaluation Tool 1 Biodiversity detectives portfolio assessment

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Portfolio assessment + Teacher observation rubric
Evaluation objective	To assess students' ability to investigate local biodiversity, identify and document plant and animal species, organise environmental observations, collaborate with peers and reflect on the importance of biodiversity conservation through a portfolio-based assessment approach.
Competences / skills assessed	<u>STEM competences</u> ● Scientific observation ● Species identification and classification ● Environmental investigation ● Data collection

	<u>Environmental competences</u> ● Biodiversity awareness ● Nature conservation ● Ecosystem understanding ● Environmental citizenship <u>Digital competences</u> ● Digital documentation ● Online species identification ● Collaborative digital mapping ● Information management <u>Transversal competences</u> ● Teamwork ● Critical thinking ● Communication ● Reflection ● Responsibility
Tool description	This portfolio-based assessment enables teachers to evaluate students throughout the Biodiversity detectives activity. Students progressively collect evidence of their learning, including field observations, photographs, species identification records, contributions to the collaborative biodiversity map and personal reflections. The portfolio allows teachers to assess both the learning process and the final outcomes, including the quality of environmental observations, understanding of local biodiversity, teamwork and students' ability to propose simple conservation actions for their school or local community.
Evaluation criteria / indicators	<u>Criterion 1 – Biodiversity observation and identification</u> 4 – Excellent; records detailed, accurate and well-organised biodiversity observations and identifies plant and animal species using appropriate evidence. 3 – Good; records accurate observations and identifies most species correctly, with only minor omissions. 2 – Satisfactory; provides basic observations and species identification but requires some guidance. 1 – Needs Improvement; records limited observations or shows difficulty identifying species.

Criterion 2 – Portfolio and biodiversity map

4 – Excellent; the portfolio is complete, well organised and includes relevant field notes, photographs, species records and a clear contribution to the collaborative biodiversity map.

3 – Good; the portfolio contains the required evidence and is generally well organised, with only minor omissions.

2 – Satisfactory; the portfolio contains basic evidence but some elements are incomplete or poorly organised.

1 – Needs Improvement; the portfolio contains limited evidence and important elements are missing.

Criterion 3 – Environmental understanding and conservation

4 – Excellent; demonstrates a clear understanding of local biodiversity, identifies factors affecting ecosystem quality and proposes realistic conservation actions.

3 – Good; demonstrates good environmental understanding and proposes appropriate conservation actions.

2 – Satisfactory, shows basic understanding of biodiversity and suggests simple conservation actions.

1 – Needs Improvement; shows limited understanding of biodiversity or its conservation.

Criterion 4 – Teamwork and participation

4 – Excellent; participates actively throughout the investigation, collaborates effectively and supports other group members.

3 – Good; collaborates positively and contributes during most stages of the activity.

2 – Satisfactory; participates in the activity but requires occasional support or encouragement.

1 – Needs Improvement; shows limited participation or collaboration.

Criterion 5 – Communication

4 – Excellent; communicates findings clearly using appropriate scientific language, environmental evidence and the biodiversity map.

3 – Good; communicates findings effectively with only minor improvements needed.

2 – Satisfactory; communicates the main findings but with limited detail or organisation.

1 – Needs Improvement; communication is incomplete or unclear.

Methodology / application	The teacher introduces the portfolio and assessment rubric before students begin the Biodiversity detectives activity and explains the assessment criteria. During the field investigation, students progressively collect evidence of their learning, including observation notes, photographs, species identification records and information for the collaborative biodiversity map. The teacher uses observation to monitor participation, scientific investigation and teamwork throughout the activity. At the end of the activity, the completed portfolio, biodiversity map and final presentation are reviewed together. Students also reflect on the importance of local biodiversity and propose simple conservation actions that could be implemented within the school or local community. Feedback can be provided throughout the activity to support both formative and summative assessment.
Inclusion and accessibility	The portfolio approach allows students to demonstrate learning through different formats, including written observations, drawings, photographs, maps or oral explanations. Flexible participation roles, visual identification guides, adapted observation routes, peer support and differentiated tasks ensure that learners with different abilities and levels of digital access can participate meaningfully in the assessment process.
Digital tools / resources	● iNaturalist — https://www.inaturalist.org ● Google My Maps — https://www.google.com/maps/d/ ● Canva — https://www.canva.com ● Padlet — https://padlet.com ● European Environment Agency – Biodiversity — https://www.eea.europa.eu/themes/biodiversity
Expected outcomes / usefulness	This evaluation tool enables teachers to assess students' scientific observation, biodiversity identification, environmental understanding, teamwork and communication within an authentic Environment-Based Learning activity. It also encourages learners to document their progress, reflect on the importance of local ecosystems and take an active role in proposing actions for biodiversity conservation within their school or community.

Learning Unit 5: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - Biodiversity detectives portfolio assessment sheet

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)	Comments
Biodiversity observations and species identification are accurate and supported by evidence	☐	☐	☐	☐	
Portfolio is complete and includes field notes, photographs and species records	☐	☐	☐	☐	
Contribution to the collaborative biodiversity map is clear and relevant	☐	☐	☐	☐	
Student demonstrates understanding of biodiversity and proposes appropriate conservation actions	☐	☐	☐	☐	
Student collaborates effectively and participates actively in the investigation	☐	☐	☐	☐	
Findings are communicated clearly and supported by environmental evidence	☐	☐	☐	☐	

Overall score

Total score: ____ / 24

Teacher feedback

Strengths:

Areas for improvement:

Suggested next step:

Student reflection

One thing I learned about biodiversity in my local environment:

One action that could help protect biodiversity in my school or community:

Learning Unit 5: Evaluation Tool 2

Food miles investigation assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Investigation assessment rubric + Digital product assessment + Student reflection
Evaluation objective	To assess students' ability to investigate the origin and environmental impact of everyday food products, calculate and compare food miles, organise and interpret data, and use evidence to make more sustainable food choices. The evaluation also assesses students' ability to collaborate during the investigation, use digital tools to research and represent information, communicate their findings clearly and reflect on the relationship between food consumption, transportation and environmental sustainability.
Competences / skills assessed	<u>STEM competences</u> • Data collection and organisation • Measurement and distance calculation

	● Mathematical reasoning ● Data comparison and interpretation ● Evidence-based problem-solving <u>Environmental competences</u> ● Understanding of food systems and food miles ● Sustainable consumption ● Awareness of transport-related environmental impacts ● Responsible food choices ● Environmental citizenship <u>Digital competences</u> ● Online research ● Use of digital maps ● Spreadsheet use and data organisation ● Creation of digital infographics ● Digital presentation of findings <u>Transversal competences</u> ● Teamwork and collaboration ● Critical thinking ● Decision-making ● Communication ● Responsible consumption
Tool description	This evaluation tool supports teachers in assessing students throughout the Food miles investigation: From farm to plate activity. Students investigate the origin of selected food products, identify where they were produced and use digital maps and other resources to estimate the distance travelled from production to consumption. They organise and compare their findings, analyse the environmental implications of food transportation and explore possible alternatives based on more local or sustainable food choices. Students communicate their findings through an infographic, visual presentation or similar product. The assessment focuses on the accuracy of food origin research and distance calculations, organisation and interpretation of data, environmental reasoning, quality of the final product, teamwork and communication.
Evaluation criteria / indicators	<u>Criterion 1 – Food origin research and data collection</u> 4 – Excellent; accurately identifies the origin of selected food products using reliable information and records complete, relevant and well-organised data. 3 – Good; identifies the origin of most food products accurately and records appropriate information with only minor omissions.

2 – Satisfactory; identifies basic information about food origins but requires guidance to complete or verify the research.

1 – Needs improvement; provides limited or inaccurate information about food origins and requires substantial support.

Criterion 2 – Food miles calculation and data organisation

4 – Excellent; calculates or estimates food miles accurately, organises the information clearly and makes meaningful comparisons between products.

3 – Good; calculates or estimates distances appropriately and organises the data clearly, with only minor inaccuracies.

2 – Satisfactory; completes basic calculations and data organisation but requires some support.

1 – Needs improvement; shows significant difficulty calculating distances or organising the collected information.

Criterion 3 – Environmental reasoning and sustainable food choices

4 – Excellent; clearly explains the relationship between food transportation and environmental impact and uses evidence to propose realistic and well-justified sustainable food choices.

3 – Good; demonstrates appropriate environmental understanding and proposes relevant sustainable alternatives.

2 – Satisfactory; shows basic understanding of environmental impacts but provides limited justification for sustainable choices.

1 – Needs improvement; shows limited understanding of the relationship between food transportation and environmental sustainability.

Criterion 4 – Infographic and digital communication

4 – Excellent; creates a clear, accurate and engaging infographic or digital product that effectively communicates data, comparisons and sustainability messages.

3 – Good; creates a well-organised digital product that communicates the main findings clearly.

2 – Satisfactory; creates a basic digital product but some information is unclear, incomplete or poorly organised.

1 – Needs improvement; the final product is incomplete or does not communicate the investigation findings effectively.

Criterion 5 – Teamwork and participation

4 – Excellent; participates actively throughout the investigation, fulfills assigned responsibilities and collaborates effectively with all group members.

	3 – Good; participates positively and contributes appropriately during most stages of the activity. 2 – Satisfactory; participates but requires occasional encouragement or support. 1 – Needs improvement; shows limited participation or collaboration. <u>Criterion 6 – Final presentation and communication</u> 4 – Excellent; presents findings clearly and confidently, using relevant evidence and appropriate environmental and STEM terminology. 3 – Good; communicates the main findings clearly and provides appropriate supporting information. 2 – Satisfactory; communicates basic findings but with limited explanation or supporting evidence. 1 – Needs improvement; the presentation is incomplete, unclear or poorly supported by the investigation.
Methodology / application	The teacher introduces the assessment criteria before students begin the Food miles investigation and explains that both the investigation process and the final product will be assessed. Students work in collaborative groups to select food products, investigate their origin and use maps or digital tools to estimate the distances travelled. They record and organise the information using tables or spreadsheets and compare the results. During the investigation, the teacher observes participation, research skills, calculations, use of digital tools and collaboration and provides formative feedback. Students then analyse the environmental implications of their findings and identify possible local or more sustainable alternatives. Each group creates an infographic or other visual product summarising its results and presents its conclusions. The final assessment combines teacher observation, accuracy of research and calculations, quality of data organisation, environmental reasoning, the final infographic or digital product and presentation.
Inclusion and accessibility	The assessment supports mixed-ability collaborative groups and flexible distribution of tasks. Students can contribute as researchers, distance calculators, data organisers, designers or presenters according to their abilities and strengths. Simplified calculation tables, visual maps, preselected food products, step-by-step instructions and peer support can be provided

	where required. Students who experience difficulties with mathematical calculations may focus on identifying origins, comparing distances visually or interpreting results. Final findings may be communicated through infographics, maps, posters, oral presentations or other accessible formats. Printed maps and teacher-provided data may replace digital resources where access to technology is limited.
Digital tools / resources	● Google Maps – https://maps.google.com ● Google Sheets – https://docs.google.com/spreadsheets ● Canva – https://www.canva.com ● FAO – Agrifood Systems – https://www.fao.org/food-systems/en/ ● European Food Information Council (EUFIC) – https://www.eufic.org ● Food miles investigation assessment sheet ● Student sustainable food choices reflection sheet
Expected outcomes / usefulness	This evaluation tool enables teachers to assess students' ability to combine mathematical reasoning, environmental investigation and digital tools to explore the sustainability of everyday food choices. It supports understanding of food miles and responsible consumption while developing data literacy, critical thinking, collaboration and communication. The assessment also encourages learners to use evidence from their own investigation to consider practical ways of making food consumption more sustainable.

Learning Unit 5: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - Food miles investigation assessment sheet

Activity: Food miles investigation: From farm to plate

Evaluation tool: HAB-EVAL-LU5-HO2

Student / Group: _____

Date: _____

Teacher: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Food origins are accurately researched and recorded	☐	☐	☐	☐	
Food miles are appropriately calculated or estimated	☐	☐	☐	☐	
Data are clearly organised and compared	☐	☐	☐	☐	
Environmental impacts are appropriately interpreted	☐	☐	☐	☐	
Sustainable food alternatives are realistic and supported by evidence	☐	☐	☐	☐	
Infographic or final digital product is clear and informative	☐	☐	☐	☐	
Digital tools are used appropriately	☐	☐	☐	☐	
Student participates actively in the investigation	☐	☐	☐	☐	
Team collaboration is effective	☐	☐	☐	☐	
Final findings are communicated clearly	☐	☐	☐	☐	

Overall score

Total score: ____ / 40

Teacher feedback

Strengths:

Areas for improvement:

Suggested next step:

MATERIAL 2 - Student sustainable food choices reflection sheet

Activity: Food miles investigation: From farm to plate

Student: _____

1. Which food product travelled the greatest distance?

2. Which food product travelled the shortest distance?

3. What surprised you most about the origin or distance travelled by the foods you investigated?

4. What environmental impacts can be associated with transporting food over long distances?

5. Which local or more sustainable alternative could you choose for one of the products investigated?

6. What could your school, family or community do to encourage more sustainable food choices?

7. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

8. Self-assessment

Statement	Yes	Partly	No
I actively participated in the investigation	☐	☐	☐
I helped research the origin of food products	☐	☐	☐
I understand how food miles can be calculated or estimated	☐	☐	☐
I helped organise or interpret the data	☐	☐	☐
I understand some environmental impacts associated with food transportation	☐	☐	☐
I contributed to the infographic or final presentation	☐	☐	☐
I can identify more sustainable food choices	☐	☐	☐

Learning Unit 5: Evaluation Tool 3

Community waste audit assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Investigation assessment rubric + Data analysis assessment + Student reflection
Evaluation objective	To assess students' ability to investigate waste generation within their school or local community, classify and quantify different types of waste, organise and interpret collected data and identify patterns and environmental challenges related to waste management. The evaluation also assesses students' ability to apply circular economy principles, propose realistic waste reduction and reuse strategies, collaborate effectively and communicate evidence-based recommendations for improving waste management in their school or community.
Competences / skills assessed	<u>STEM competences</u> ● Environmental data collection ● Classification and quantification ● Mathematical reasoning ● Data organisation and analysis ● Evidence-based problem-solving <u>Environmental competences</u> ● Understanding of waste generation and management ● Circular economy awareness ● Responsible consumption ● Waste prevention, reuse and recycling ● Environmental responsibility <u>Digital competences</u> ● Digital data recording ● Spreadsheet use ● Creation of graphs and visualisations ● Digital presentation of findings ● Information organisation

	<u>Transversal competences</u> ● Teamwork and collaboration ● Critical thinking ● Problem-solving ● Decision-making ● Communication ● Environmental citizenship
Tool description	This evaluation tool supports teachers in assessing students throughout the Community waste audit activity. Students work collaboratively to investigate waste generation within their school or local community. They collect, classify and quantify different types of waste, organise the information in tables or spreadsheets and analyse the results to identify significant patterns, problematic waste categories and opportunities for improvement. Based on the evidence collected, students explore circular economy principles and develop practical recommendations to reduce waste, increase reuse and improve recycling. They communicate their findings and proposed actions through graphs, posters, infographics or presentations. The assessment focuses on the quality and accuracy of the waste audit, data organisation and interpretation, understanding of circular economy principles, feasibility of proposed actions, teamwork and communication.
Evaluation criteria / indicators	<u>Criterion 1 – Waste collection and classification</u> 4 – Excellent; collects and classifies waste systematically and accurately using clear and appropriate categories and records complete and reliable information. 3 – Good; collects and classifies waste appropriately with only minor omissions or inaccuracies. 2 – Satisfactory; collects and classifies basic waste information but requires some guidance. 1 – Needs improvement; collects limited or inaccurate information and shows difficulty classifying waste appropriately. <u>Criterion 2 – Quantification and data organisation</u> 4 – Excellent; measures or quantifies waste accurately and organises the collected data clearly using appropriate tables, spreadsheets, graphs or other representations. 3 – Good, quantifies and organises the data appropriately with only minor inaccuracies.

2 – Satisfactory; provides basic measurements and data organisation but requires support.

1 – Needs improvement; shows significant difficulty quantifying waste or organising the collected data.

Criterion 3 – Data analysis and environmental interpretation

4 – Excellent; identifies relevant patterns and waste-management problems and develops clear, evidence-based interpretations of their environmental significance.

3 – Good; identifies the main patterns and appropriately interprets most of the waste data.

2 – Satisfactory; recognises some basic patterns but requires guidance to interpret their environmental significance.

1 – Needs improvement; shows limited understanding of the data or provides conclusions that are not supported by the evidence.

Criterion 4 – Circular economy and proposed actions

4 – Excellent; demonstrates a clear understanding of circular economy principles and proposes realistic, relevant and well-justified actions for waste prevention, reduction, reuse or recycling.

3 – Good; demonstrates appropriate understanding of circular economy principles and proposes relevant actions.

2 – Satisfactory; demonstrates basic understanding and proposes general actions with limited justification.

1 – Needs improvement; shows limited understanding of circular economy principles or proposes actions that are unclear or unrealistic.

Criterion 5 – Teamwork and participation

4 – Excellent; participates actively throughout the waste audit, fulfils assigned responsibilities and collaborates effectively with all group members.

3 – Good; participates positively and contributes appropriately during most stages of the activity.

2 – Satisfactory; participates in the activity but requires occasional support or encouragement.

1 – Needs improvement; shows limited participation or collaboration.

Criterion 6 – Communication of findings and recommendations

	4 – Excellent; communicates findings clearly and effectively using relevant data and evidence and presents realistic and well-supported recommendations. 3 – Good; communicates the main findings clearly and provides appropriate recommendations supported by the investigation. 2 – Satisfactory; communicates basic findings but provides limited evidence or explanation. 1 – Needs improvement; findings or recommendations are incomplete, unclear or poorly supported.
Methodology / application	The teacher introduces the assessment rubric before students begin the Community waste audit and explains the main criteria and the importance of collecting reliable data. Students work in small groups to investigate waste generation in selected areas of the school or local community. They identify appropriate waste categories and collect, classify and quantify the waste observed or generated during the selected period. Students record and organise their results using tables, spreadsheets or other appropriate formats and create graphs or visual representations to facilitate comparison and interpretation. During the investigation, the teacher observes students' participation, data collection, classification, mathematical reasoning, use of digital tools and collaboration and provides formative feedback. Students then analyse their findings, identify the most significant waste-management challenges and apply circular economy principles to propose practical actions for waste prevention, reduction, reuse and recycling. The final assessment combines teacher observation, quality of the waste audit, accuracy and organisation of data, environmental interpretation, proposed actions and communication of findings.
Inclusion and accessibility	The activity allows students to take different roles according to their abilities and strengths, including waste observer, classifier, recorder, data analyst, graph creator or presenter. Teachers may provide predefined waste categories, visual classification guides, simplified recording sheets, partially completed tables, calculators or graph templates where necessary. Tasks involving direct handling of waste can be replaced by observation, photographic documentation or analysis of teacher-provided data when appropriate.

	Students may communicate their findings through written reports, graphs, posters, infographics, photographs or oral presentations. Where access to digital technologies is limited, paper-based recording and visualisation can replace digital tools without affecting the main assessment objectives.
Digital tools / resources	● Google Sheets – https://docs.google.com/spreadsheets ● Google Forms – https://docs.google.com/forms ● Canva – https://www.canva.com ● Padlet – https://padlet.com ● European Commission – Circular Economy Action Plan – https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en ● European Environment Agency; Waste and recycling ● Community waste audit assessment sheet ● Student waste and circular economy reflection sheet
Expected outcomes / usefulness	This evaluation tool enables teachers to assess students' ability to carry out a structured environmental investigation based on real waste-generation data from their school or community. It supports the development of mathematical reasoning, environmental data literacy, critical thinking and understanding of circular economy principles while encouraging learners to move from observation and analysis to practical action. The assessment also promotes responsible consumption and environmental citizenship by encouraging students to use evidence from their own waste audit to propose realistic improvements for their school or local community.

Learning Unit 5: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - Community waste audit assessment sheet

Activity: Community waste audit: Investigating waste generation and promoting circular economy
 Evaluation tool: HAB-EVAL-LU5-HO3

Student / Group: _____

Date: _____

Teacher: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Waste is systematically collected or observed and appropriately classified	☐	☐	☐	☐	
Waste quantities are accurately measured or estimated	☐	☐	☐	☐	
Data are clearly recorded and organised	☐	☐	☐	☐	
Graphs or visualisations represent the results appropriately	☐	☐	☐	☐	
Relevant waste patterns and problems are identified	☐	☐	☐	☐	
Environmental impacts are appropriately interpreted	☐	☐	☐	☐	
Circular economy principles are understood and applied	☐	☐	☐	☐	
Proposed waste reduction, reuse or recycling actions are realistic	☐	☐	☐	☐	
Student participates actively and collaborates effectively	☐	☐	☐	☐	
Findings and recommendations are communicated clearly	☐	☐	☐	☐	

Overall score

Total score: ____ / 40

Teacher feedback

Strengths:

Areas for improvement:

Suggested next step:

MATERIAL 2 - Student waste and circular economy reflection sheet

Activity: Community waste audit

Student: _____

1. Which type of waste was most common in your investigation?

2. Which result of the waste audit surprised you most?

3. What do you think are the main causes of the waste identified?

4. Which waste could have been prevented, reduced, reused or recycled?

5. What practical action would you propose to reduce waste in your school or community?

6. How does your proposal relate to the circular economy?

7. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

8. Self-assessment

Statement	Yes	Partly	No
I actively participated in the waste audit	☐	☐	☐
I helped classify or quantify the waste	☐	☐	☐
I helped organise or analyse the data	☐	☐	☐
I understand some environmental impacts of waste	☐	☐	☐
I understand the basic principles of the circular economy	☐	☐	☐
I contributed to proposing practical solutions	☐	☐	☐
I can identify ways to reduce, reuse or recycle waste	☐	☐	☐

Learning Unit 5: Evaluation Tool 4

Community green space action project assessment rubric

Field	Evaluation Tool Information
Target group	11–14 / 15–18
Type of evaluation tool	Teacher observation rubric + Water journey portfolio + Collaborative assessment
Evaluation objective	To assess students' ability to investigate the environmental condition of a local green space, identify biodiversity and sustainability challenges and develop realistic actions to improve, protect or restore the selected area. The evaluation also assesses students' ability to collaborate with peers and community stakeholders, apply environmental and STEM knowledge, plan and communicate practical solutions and reflect on the environmental and community impact of their actions.
Competences / skills assessed	<u>STEM competences</u> ● Environmental observation and investigation ● Data collection and interpretation ● Problem-solving ● Evidence-based decision-making ● Project planning <u>Environmental competences</u> ● Biodiversity awareness ● Ecosystem understanding ● Environmental conservation ● Sustainable management of green spaces ● Environmental responsibility <u>Digital competences</u> ● Digital documentation ● Online environmental research ● Digital mapping ● Creation of digital presentations and communication materials ● Collaborative use of digital tools <u>Transversal competences</u>

	● Teamwork and collaboration ● Community engagement ● Critical thinking ● Planning and decision-making ● Communication ● Civic and environmental responsibility
Tool description	This evaluation tool supports teachers in assessing students throughout the Adopt a green space community action project. Students work collaboratively to select and investigate a local green space, such as a school garden, park or other accessible natural area. They observe its environmental condition, identify biodiversity and sustainability challenges and collect evidence through notes, photographs, maps or other appropriate methods. Based on their investigation, students develop a realistic community action plan to improve, protect or restore the selected green space. Proposed actions may address biodiversity conservation, habitat improvement, waste reduction, environmental awareness or sustainable use of the area. The assessment focuses on the quality of the environmental investigation, relevance and feasibility of the proposed action plan, application of environmental knowledge, community engagement, teamwork, communication and reflection on the potential or actual impact of the project.
Evaluation criteria / indicators	<u>Criterion 1 – Environmental investigation of the green space</u> 4 – Excellent; conducts a systematic and detailed investigation, collecting accurate and relevant evidence about the environmental condition, biodiversity and sustainability challenges of the selected green space. 3 – Good; conducts an appropriate investigation and identifies the main environmental characteristics and challenges with only minor omissions. 2 – Satisfactory; conducts a basic investigation but requires guidance to identify or document relevant environmental information. 1 – Needs improvement; provides limited or inaccurate observations and requires substantial support to investigate the green space. <u>Criterion 2 – Identification and analysis of environmental challenges</u>

- 4 – Excellent; clearly identifies and analyses relevant environmental challenges and supports conclusions with appropriate evidence from the investigation.
- 3 – Good; identifies appropriate environmental challenges and provides a generally clear analysis.
- 2 – Satisfactory; identifies basic environmental problems but provides limited analysis or supporting evidence.
- 1 – Needs improvement; shows significant difficulty identifying or explaining environmental challenges.

Criterion 3 – Community action plan

- 4 – Excellent; develops a clear, realistic and well-structured action plan with appropriate objectives, actions, responsibilities and expected environmental benefits.
- 3 – Good; develops an appropriate and feasible action plan with clear actions and expected outcomes.
- 2 – Satisfactory; develops a basic action plan but some actions, responsibilities or expected outcomes require further development.
- 1 – Needs improvement; the action plan is incomplete, unclear or unrealistic.

Criterion 4 – Community engagement and environmental impact

- 4 – Excellent; demonstrates meaningful engagement with the school or wider community and clearly explains how the proposed actions could contribute to biodiversity, sustainability and improvement of the green space.
- 3 – Good; demonstrates appropriate community engagement and identifies relevant environmental benefits.
- 2 – Satisfactory; shows limited community engagement or provides only a basic explanation of potential environmental benefits.
- 1 – Needs improvement; shows little connection with the community or limited understanding of the environmental impact of the proposed actions.

Criterion 5 – Teamwork and participation

- 4 – Excellent; participates actively and responsibly throughout the project, fulfils assigned roles and contributes effectively to collaborative decision-making.
- 3 – Good; participates positively and collaborates effectively during most stages of the project.
- 2 – Satisfactory; participates in the project but requires occasional support or encouragement.

	1 – Needs improvement; shows limited participation or collaboration. <u>Criterion 6 – Communication and presentation</u> 4 – Excellent; communicates the investigation, action plan and expected or achieved results clearly and convincingly using appropriate environmental evidence and visual or digital resources. 3 – Good; communicates the main findings and proposed actions clearly with appropriate supporting information. 2 – Satisfactory; communicates basic information but provides limited explanation, evidence or organisation. 1 – Needs improvement; communication is incomplete, unclear or poorly supported.
Methodology / application	The teacher introduces the assessment rubric before students begin the Adopt a green space project and explains that both the project process and its outcomes will be assessed. Students work in collaborative groups to select an appropriate school or community green space and investigate its environmental condition. They collect evidence through direct observation, photographs, maps, biodiversity records or other relevant sources and identify environmental challenges or opportunities for improvement. Groups use the evidence collected to develop a community action plan. They define the environmental challenge, establish objectives, propose practical actions, distribute responsibilities and consider the resources and community involvement required. Where possible, students implement selected actions or present their proposals to the school or local community. The teacher observes participation, collaboration, environmental reasoning and project development throughout the process and provides formative feedback. The final assessment combines teacher observation, quality of the environmental investigation, feasibility and sustainability of the action plan, community engagement, teamwork, communication and reflection on the project's environmental and social impact.
Inclusion and accessibility	The project allows students to take different roles according to their abilities, interests and strengths, including environmental

	observer, photographer, biodiversity recorder, researcher, project planner, community liaison or presenter. Teachers may provide simplified observation sheets, visual guides, predefined environmental challenges, action-plan templates and step-by-step instructions where necessary. Outdoor tasks can be adapted for learners with mobility or sensory needs, and alternative evidence such as photographs, maps, videos or teacher-provided environmental information may be used when direct access to the green space is limited. Students may communicate their project through oral presentations, posters, maps, photographs, infographics, videos or other accessible formats. Collaborative work enables learners to contribute according to their individual strengths while remaining actively involved in the project.
Digital tools / resources	● Google My Maps – https://www.google.com/maps/d/ ● iNaturalist – https://www.inaturalist.org ● Canva – https://www.canva.com ● Padlet – https://padlet.com ● European Environment Agency – Nature and Biodiversity – https://www.eea.europa.eu/themes/biodiversity ● Google Slides / Microsoft PowerPoint
Expected outcomes / usefulness	This evaluation tool enables teachers to assess students' ability to move from environmental observation to practical community action within a real local context. It supports the development of environmental awareness, biodiversity knowledge, problem-solving, project planning, teamwork and civic engagement while encouraging learners to take responsibility for their local environment. The assessment also helps students understand that Environment-Based Learning can extend beyond investigation by transforming evidence and knowledge into realistic actions that contribute to biodiversity conservation, sustainability and community well-being.

Learning Unit 5: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Community green space action project assessment sheet

Activity: Adopt a green space: A community action project for biodiversity and sustainability

Evaluation tool: HAB-EVAL-LU5-HO4

Student / Group: _____

Date: _____

Teacher: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
The green space is systematically investigated and documented	☐	☐	☐	☐	
Relevant environmental and biodiversity challenges are identified	☐	☐	☐	☐	
Conclusions are supported by appropriate environmental evidence	☐	☐	☐	☐	
The community action plan has clear and relevant objectives	☐	☐	☐	☐	
Proposed actions are realistic, feasible and environmentally appropriate	☐	☐	☐	☐	
Responsibilities and resources are appropriately considered	☐	☐	☐	☐	
The project demonstrates meaningful school or community engagement	☐	☐	☐	☐	
Expected or achieved environmental benefits are clearly identified	☐	☐	☐	☐	
Student participates actively and collaborates effectively	☐	☐	☐	☐	
The project and its results are communicated clearly	☐	☐	☐	☐	

Overall score

Total score: ____ / 40

Teacher feedback

Strengths:

Areas for improvement:

Suggested next step:

MATERIAL 2 - Student green space project reflection sheet

Activity: Adopt a green space

Student:

1. What green space did your group investigate?

2. What was the main environmental or biodiversity challenge you identified?

3. What evidence helped your group identify this challenge?

4. What action did your group propose or carry out?

5. How could this action improve biodiversity or sustainability in the green space?

6. How did your school or local community contribute, or how could they contribute to the project?

7. What would you improve if you continued the project?

8. How well did your group work together?

- ☐ Excellent
- ☐ Good
- ☐ Satisfactory
- ☐ Needs improvement

9. Self-assessment

Statement	Yes	Partly	No
I actively participated in investigating the green space	☐	☐	☐
I helped identify environmental or biodiversity challenges	☐	☐	☐
I contributed ideas to the community action plan	☐	☐	☐
I helped decide how the proposed actions could be implemented	☐	☐	☐
I collaborated effectively with my group	☐	☐	☐
I understand how our project could benefit the environment	☐	☐	☐
I understand why community participation is important for environmental action	☐	☐	☐

Learning Unit 6: Assessment and Impact Evaluation of EBL in Disadvantaged Contexts

Learning Unit 6 focuses on the practical use of assessment and impact evaluation within Environment-Based Learning (EBL), helping educators and learners collect evidence, reflect on learning processes and understand the educational and environmental impact of EBL activities. The Evaluation Methods and Tools provide accessible and participatory approaches for assessing learning outcomes, competences, engagement and connection to nature.

Through observation, reflection, self-assessment and impact evaluation methods, educators can monitor learners' progress while encouraging their active participation in the assessment process. Particular attention is given to inclusive, flexible and adaptable evaluation approaches that can respond to different learner needs and educational contexts, especially in disadvantaged and diverse settings.

Learning Unit 6: Evaluation Tool 1 Co-designed EBL Observation Checklist Teacher Observation Tool

Field	Evaluation Tool Information
Target group	Teachers / Educators and learners aged 11–18
Type of evaluation tool	Observation checklist / Formative assessment
Evaluation objective	To support the assessment of students' STEM process skills during an Environment-Based Learning (EBL) activity using the observation criteria co-designed by learners in Hands-On Exercise 1. The tool enables teachers to collect simple, formative evidence of how students apply agreed investigation skills such as questioning, observing, recording, measuring and collaborating. It complements the students' self- and peer-assessment checklist by providing a teacher observation perspective.

Competences / skills assessed	<u>STEM competences:</u> ● Asking investigable questions, systematic observation, measuring and recording, identifying patterns and drawing evidence-based conclusions. <u>Environmental competences:</u> ● Observing environmental phenomena and connecting local observations with wider environmental processes. <u>Transversal competences:</u> ● Collaboration, communication, problem-solving, persistence and reflective thinking. <u>Self-regulation competences:</u> ● awareness of progress and ability to identify areas for improvement.
Tool description	This evaluation tool is used alongside the checklist co-designed by students in Hands-On Exercise 1. Before carrying out an EBL activity, learners agree on three to five simple criteria describing effective scientific investigation. These criteria are transferred to the teacher observation checklist. During the activity, the teacher observes selected students or groups and records brief factual evidence against the agreed criteria. The same or equivalent criteria are used by students for self- and peer-assessment, allowing different perspectives on the learning process to be compared. The purpose is formative rather than summative. The tool helps identify progress, support needs and aspects of the learning activity that may need to be adapted.
Evaluation criteria / indicators	Depending on the criteria co-designed by the class, indicators may include: ● The student asks a question that can be investigated. ● The student observes carefully and records what is actually seen. ● The student uses measurements, counts or comparisons where appropriate. ● The student uses evidence to explain findings or conclusions. ● The student adapts an approach when something does not work. ● The student explains their reasoning to others. ● The student contributes actively to the shared investigation.

	● The student listens to and considers the contributions of peers. Each selected indicator can be recorded using: <i>Observed independently / Observed with support / Not observed on this occasion</i> “Not observed” should indicate that evidence was not collected during that particular observation and should not be interpreted as a negative judgement about the learner.
Methodology / application	1. Before the EBL activity, students and the teacher co-design three to five simple criteria describing effective participation in the investigation. 2. The teacher transfers the agreed criteria to the Teacher Observation Checklist. 3. The criteria are shared with all learners in clear and accessible language before the activity begins. 4. During the EBL activity, the teacher observes selected students or groups and records short factual notes against the criteria. 5. Where appropriate, the teacher asks short questions such as “What made you decide that?”, “How could you check that?” or “What would you do differently?” 6. After the activity, students complete their own self- or peer-assessment using the corresponding checklist. 7. The teacher compares the different sources of evidence and identifies strengths, support needs and possible adaptations for future EBL activities. 8. Repeated use of the tool across different activities can provide evidence of progression over time.
Inclusion and accessibility	● The criteria should be written in simple, learner-friendly language and may be supported by icons or visual symbols. ● Students are not required to produce written evidence, as observations are recorded by the teacher. ● Competences may be demonstrated orally, visually, practically or through gesture. ● Learners may explain their reasoning in their preferred or home language where appropriate. ● “Observed with support” recognises achievement with assistance rather than treating support as a deficit. ● Teachers should focus on observable actions and evidence rather than subjective judgements about learners.

	• The number and complexity of indicators can be reduced according to learners' needs and educational context.
Digital tools / resources	• No digital tools are required. The checklist can be completed on paper. • Where appropriate, a digital form or tablet may be used to record observations. Any photographs, audio or video used as supporting evidence should comply with the school's consent, privacy and data-protection procedures. • The Education Endowment Foundation review of feedback approaches provides the evidence base for the formative use of observation and questioning: https://educationendowmentfoundation.org.uk/education-evidence/evidence-reviews/feedback-approaches • Co-designed EBL Observation Checklist; Teacher Observation Tool. (see <i>Materials</i>)
Expected outcomes / usefulness	The tool provides teachers with practical formative evidence of students' STEM investigation skills while an EBL activity is taking place. Because the criteria originate from the co-design process in Hands-On Exercise 1, learners understand what is being observed and participate actively in defining successful learning. Combining teacher observation with student self- and peer-assessment provides a broader picture of progress and helps teachers identify appropriate support and adaptations for subsequent EBL activities. The tool is particularly suitable for inclusive and disadvantaged educational contexts because it does not depend primarily on written performance and recognises different ways of demonstrating learning.

Learning Unit 6: Evaluation Tool 1

Practical assessment materials

MATERIAL 1 - Co-designed EBL Observation Checklist

ECOTEACH – LU6 / Evaluation Tool 1

Related Hands-On Exercise: Co-design of an EBL observation checklist

Teacher / Educator: _____

Class / Group: _____

EBL Activity: _____

Date: _____

Instructions

Select 3–5 criteria co-designed with the learners before the EBL activity. During the activity, observe selected students or groups and record the evidence observed.

Co-designed observation criterion	Observed independently	Observed with support	Not observed on this occasion	Brief evidence / notes
1. _____	☐	☐	☐	_____
2. _____	☐	☐	☐	_____
3. _____	☐	☐	☐	_____
4. _____	☐	☐	☐	_____
5. _____	☐	☐	☐	_____

Suggested criteria

These may be used as examples when co-designing the checklist with learners:

Suggested criterion	Evidence to look for
I ask questions	The learner asks a question that can be investigated.
I observe carefully	The learner records what is actually observed rather than what was expected.
I use evidence	The learner uses observations, measurements or comparisons to support an idea.
I adapt my approach	The learner changes or improves a method when necessary.
I explain my thinking	The learner communicates their reasoning to others.
I collaborate	The learner contributes to the group and considers others' ideas.

Teacher reflection

What did students demonstrate particularly well?

Where was additional support needed?

What should be adapted or reinforced in the next EBL activity?

Additional observations

Optional learner follow-up

After the activity, learners can compare the teacher's observations with their own self- or peer-assessment checklist and briefly discuss:

One thing I did well:

One thing I would like to improve next time:

Learning Unit 6: Evaluation Tool 2

Reflection circle assessment and student reflection log

Field	Evaluation Tool Information
Target group	Learners aged 11–18
Type of evaluation tool	Student reflection log + Peer reflection + Teacher observation

Evaluation objective	To assess students' ability to reflect on their Environment-Based Learning (EBL) experience, identify what they learned, recognise challenges and successes, communicate their ideas and listen respectfully to the reflections of others. The tool also enables educators to collect formative evidence about learners' understanding, engagement, confidence and perceived support needs while encouraging students to participate actively in the evaluation of their own learning experience.
Competences / skills assessed	<u>STEM competences</u> ● Reflection on investigation processes ● Evidence-based reasoning ● Identification of learning and problem-solving strategies ● Recognition of challenges and possible improvements <u>Environmental competences</u> ● Reflection on environmental experiences ● Awareness of local environmental issues ● Connection between environmental observations and learning ● Environmental responsibility <u>Transversal competences</u> ● Reflective thinking ● Communication ● Active listening ● Peer feedback ● Collaboration ● Self-awareness <u>Self-regulation competences</u> ● Recognition of strengths and difficulties ● Identification of learning progress ● Ability to identify areas for improvement ● Expression of support needs
Tool description	This evaluation tool is used alongside Hands-On Exercise 2 – Reflection circles to help learners reflect individually and collectively on an EBL experience. Following an EBL activity, students first complete a short individual reflection log focusing on what they did, what they learned, what they found challenging or interesting and what they might do differently next time. Students then participate in a structured reflection circle in which they may share selected reflections, listen to their peers and

	identify common learning experiences, challenges and suggestions. The teacher observes the reflection process and records brief evidence of participation, reflective thinking, communication and listening. The information collected can also help educators identify aspects of future EBL activities that may need to be reinforced, supported or adapted.
Evaluation criteria / indicators	<u>Criterion 1 – Reflection on the learning experience</u> 4 – Excellent; provides a clear and thoughtful reflection on the EBL experience, identifying specific learning, experiences and relevant evidence. 3 – Good; provides a clear reflection and identifies relevant aspects of the learning experience. 2 – Satisfactory; provides a basic reflection but requires some prompts or support to identify learning. 1 – Needs improvement; provides limited reflection or has difficulty identifying what was learned. <u>Criterion 2 – Identification of challenges and improvements</u> 4 – Excellent; clearly identifies challenges encountered, explains how they were addressed and proposes realistic improvements for future learning. 3 – Good; identifies relevant challenges and suggests appropriate improvements. 2 – Satisfactory; identifies a basic challenge or improvement but provides limited explanation. 1 – Needs improvement; shows difficulty identifying challenges or possible improvements. <u>Criterion 3 – Communication of reflections</u> 4 – Excellent; communicates reflections clearly and confidently, using relevant examples from the EBL experience. 3 – Good; communicates reflections clearly with appropriate examples. 2 – Satisfactory; communicates basic ideas but requires some support or prompting. 1 – Needs improvement; has difficulty communicating reflections or provides very limited information. <u>Criterion 4 – Active listening and peer participation</u> 4 – Excellent; listens attentively, respects different perspectives and contributes constructively to the reflection circle.

	3 – Good; listens appropriately and participates positively in the group reflection. 2 – Satisfactory; participates but requires occasional reminders or support to listen or respond constructively. 1 – Needs improvement; shows limited participation or difficulty engaging respectfully with peer reflections. <u>Criterion 5 – Self-awareness and support needs</u> 4 – Excellent; clearly recognises personal strengths, areas for improvement and support that could help future learning. 3 – Good; identifies relevant strengths or areas for improvement and some appropriate support needs. 2 – Satisfactory; identifies basic strengths or difficulties with some guidance. 1 – Needs improvement; shows difficulty recognising personal progress or support needs.
Methodology / application	1. f the reflection is to understand the learning experience rather than to judge individual performance. 2. Students complete the short Student reflection log individually. Written responses may be replaced by oral, visual or other accessible forms where appropriate. 3. Students sit or work in a circle or another inclusive group arrangement. 4. The teacher introduces a small number of reflection prompts and reminds students that participation should be respectful and supportive. 5. Students share selected reflections voluntarily, listen to their peers and may respond to or build upon others' ideas. 6. The teacher facilitates the discussion without dominating it and records brief observations using the Teacher observation sheet. 7. At the end of the reflection circle, the group identifies one or two common strengths and one or two aspects that could improve future EBL experiences. 8. The teacher uses the individual reflections and group feedback to adapt subsequent learning activities where appropriate.
Inclusion and accessibility	The reflection process should be low-stakes, supportive and flexible. Learners should not be required to disclose personal information or experiences they do not wish to share with the group. Students may respond through writing, drawing, symbols, photographs, short audio recordings or oral explanations.

	Sentence starters, visual prompts and simplified questions may be provided where appropriate. Learners who are uncomfortable speaking in front of the group may choose to share through a peer, submit their reflection privately to the teacher or participate primarily through listening. Additional thinking time, smaller reflection groups, peer support or use of the learner's preferred or home language may be provided where appropriate. The emphasis should be on meaningful participation and reflection rather than the quantity or complexity of written or spoken responses.
Digital tools / resources	No digital tools are required. Where appropriate, students may use: ● Digital forms ● Tablets or computers ● Audio recording tools ● Padlet or another collaborative reflection platform ● Digital alternatives should only be used where they improve accessibility or participation. ● Existing peer and self-assessment instruments are available free from the NAAEE eeVAL methods library: https://evaluation.naaee.org/resources/methods-library ● Student EBL reflection log (<i>see Materials</i>) ● Reflection circle teacher observation sheet (<i>see Materials</i>)
Expected outcomes / usefulness	This evaluation tool provides educators with qualitative evidence about students' learning experiences, understanding, engagement and support needs following an EBL activity. It encourages learners to recognise their own progress, articulate challenges and learn from the perspectives of their peers. The reflection circle also provides teachers with direct feedback that can be used to improve future EBL activities and make them more responsive to learners' needs. The tool is particularly suitable for disadvantaged and diverse educational contexts because it uses flexible, low-stakes and participatory approaches and allows learners to demonstrate reflection in different ways.

Learning Unit 6: Evaluation Tool 2

Practical assessment materials

MATERIAL 1 - Student EBL reflection log

ECOTEACH – LU6 / Evaluation Tool 2

Related Hands-On Exercise: Reflection circles

Student: _____

EBL activity: _____

Date: _____

My reflection

1. What did we do in this activity?

2. What is one important thing I learned?

3. What did I find most interesting or surprising?

4. What was difficult or challenging for me?

5. What helped me when I found something difficult?

6. What did I contribute to the activity or to my group?

7. What would I do differently next time?

8. Is there anything that would help you participate or learn better in the next EBL activity?

How do I feel about my learning?

Statement	Yes	Partly	Not yet
I understand what we investigated	☐	☐	☐
I can explain something new that I learned	☐	☐	☐
I contributed to the activity	☐	☐	☐
I listened to and considered other people's ideas	☐	☐	☐
I can identify something I would improve next time	☐	☐	☐

MATERIAL B - Reflection circle teacher observation sheet

Teacher / Educator: _____

Class / Group: _____

EBL activity: _____

Date: _____

Instructions

Use this sheet during or immediately after the reflection circle. The purpose is to record brief formative evidence, not to grade the quality of individual opinions or personal experiences.

Observation criterion	Observed independently	Observed with support	Not observed on this occasion	Brief evidence / notes
Identifies something learned during the EBL activity	☐	☐	☐	
Reflects on a challenge or difficulty	☐	☐	☐	
Identifies a possible improvement or next step	☐	☐	☐	

Communicates ideas or reflections clearly	☐	☐	☐	
Listens respectfully to peers	☐	☐	☐	
Responds constructively to other perspectives	☐	☐	☐	
Recognises personal strengths or support needs	☐	☐	☐	

Group reflection

What did learners identify as the main learning from the activity?

What challenges were mentioned most frequently?

What aspects of the activity worked particularly well?

What could be adapted or improved in the next EBL activity?

Were any additional support or accessibility needs identified?

Suggested actions for the next EBL activity

Learning Unit 6: Evaluation Tool 3

Connection to nature pre- and post- assessment using the INS scale

Field	Evaluation Tool Information
Target group	Learners aged 11–14 / 15–18
Type of evaluation tool	Pre- and post-assessment + Student reflection + Group data analysis
Evaluation objective	To assess changes in learners' perceived connection to nature before and after an Environment-Based Learning (EBL) experience using the Inclusion of Nature in Self (INS) scale. The tool also supports learners in interpreting simple pre- and post-assessment data, reflecting on possible changes in their relationship with nature and discussing how EBL experiences may influence environmental awareness, attitudes and personal connection to the natural environment.
Competences / skills assessed	<u>STEM competences</u> • Data collection • Comparison of pre- and post-assessment data • Data representation and interpretation • Identification of patterns and changes • Evidence-based reasoning <u>Environmental competences</u> • Connection to nature • Environmental awareness • Reflection on human–nature relationships • Recognition of personal environmental attitudes <u>Digital competences</u> • Digital data recording, where appropriate • Use of spreadsheets to organise results • Creation and interpretation of simple graphs • Responsible handling of assessment data <u>Transversal competences</u> • Self-reflection • Critical thinking • Communication • Interpretation of evidence • Respect for different perspectives

Tool description	This evaluation tool is used alongside Hands-On Exercise 3 - Measuring connection using the Inclusion of Nature in Self (INS) scale. Learners complete the INS scale before and after an EBL experience. The scale provides a simple visual representation of perceived connection between the self and nature, allowing learners to select the image that best represents how connected they currently feel to the natural environment. Pre- and post-assessment responses are compared at individual or group level. Where appropriate, anonymised class results can be organised in a table or represented graphically to identify overall patterns and changes. Students then reflect on their results and discuss whether the EBL experience influenced their perceived connection to nature and what aspects of the experience may have contributed to any change. The purpose is not to grade learners according to how connected they feel to nature, but to use the scale as a simple impact-evaluation and reflection tool.
Evaluation criteria / indicators	<u>Criterion 1 – Completion of the pre- and post-assessment</u> 4 – Excellent; completes both assessments carefully and demonstrates a clear understanding of the purpose of comparing the two responses. 3 – Good; completes both assessments appropriately and understands the main purpose of the comparison. 2 – Satisfactory; completes the assessments but requires some support to understand their purpose. 1 – Needs improvement; completes only part of the assessment or requires substantial support. <u>Criterion 2 – Comparison and interpretation of results</u> 4 – Excellent; accurately compares the pre- and post-assessment results and provides a thoughtful interpretation of change or stability. 3 – Good; compares the results appropriately and provides a clear basic interpretation. 2 – Satisfactory; identifies whether the result changed but requires guidance to interpret its meaning.

	1 – Needs improvement; shows difficulty comparing or interpreting the results. <u>Criterion 3 – Data representation and analysis</u> 4 – Excellent; organises and represents anonymised group data clearly and accurately and identifies meaningful patterns in the results. 3 – Good; organises and represents data appropriately and identifies the main patterns. 2 – Satisfactory; produces a basic representation of the data but requires some support to interpret patterns. 1 – Needs improvement; shows significant difficulty organising, representing or interpreting the data. <u>Criterion 4 – Reflection on connection to nature</u> 4 – Excellent; provides a thoughtful reflection on personal connection to nature and identifies specific aspects of the EBL experience that may have influenced it. 3 – Good; reflects clearly on connection to nature and identifies relevant aspects of the EBL experience. 2 – Satisfactory; provides a basic reflection but requires prompts or support. 1 – Needs improvement; provides limited reflection or has difficulty connecting the experience with personal perceptions. <u>Criterion 5 – Respectful interpretation and discussion</u> 4 – Excellent; discusses results thoughtfully, recognises that individual experiences may differ and avoids making unsupported judgements about others. 3 – Good; discusses results appropriately and respects different responses and perspectives. 2 – Satisfactory; participates in the discussion but requires occasional guidance when interpreting different responses. 1 – Needs improvement; shows difficulty discussing results appropriately or respecting different perspectives.
Methodology / application	1. Before the selected EBL experience, the teacher explains the purpose of the INS scale and clarifies that there are no correct or incorrect responses. 2. Each learner completes the pre-assessment INS scale individually. 3. The teacher records the responses confidentially or collects anonymised class data where group analysis is planned.

	4. Learners participate in the selected EBL experience. 5. Immediately after the experience, or at another appropriate agreed point, learners complete the post-assessment INS scale. 6. Learners compare their own pre- and post-assessment responses and complete a short reflection. 7. Where appropriate, anonymised class results are organised in a table or spreadsheet and represented using a simple graph. 8. Students identify patterns such as increases, decreases or unchanged responses and discuss possible explanations without judging individual participants. 9. The teacher facilitates a final reflection on what the data can and cannot demonstrate about the impact of the EBL experience. 10. Results may be used as formative evidence when planning future EBL activities or repeated over time to explore longer-term patterns.
Inclusion and accessibility	The INS scale is visual and requires very little written language, making it suitable for learners with different literacy levels and language backgrounds. The teacher should explain the visual scale clearly and check that learners understand how the overlapping circles represent perceived connection between self and nature. Students may explain their responses orally, visually or through short written reflections. Learners should never be required to justify personal feelings or disclose information they do not wish to share. Individual results should be treated sensitively. When class results are discussed, data should be anonymised and presented collectively. Different scores must not be interpreted as indicating that one learner has a “better” or “worse” relationship with nature. The focus should be on reflection and change rather than judgement. Additional visual explanation, oral support, peer assistance or alternative communication methods may be provided where required.
Digital tools / resources	● No digital tools are required to complete the INS scale. ● Where appropriate, the following may be used for group data analysis: ○ Google Sheets / Microsoft Excel ○ Google Forms

	○ Simple graphing tools ○ Interactive whiteboard or projector ● Inclusion of Nature in Self (INS) scale ● INS pre- and post-assessment sheet (see Materials) ● INS results and student reflection sheet (see Materials) ● Group data analysis sheet (see Materials)
Expected outcomes / usefulness	This evaluation tool provides a simple way to explore possible changes in learners' perceived connection to nature following an EBL experience. The pre and post assessment structure introduces learners to basic principles of impact evaluation while also developing data literacy, comparison and interpretation skills. By analysing anonymised class data, learners can explore patterns collectively while recognising that environmental experiences may affect individuals differently. The tool also supports reflective learning by encouraging students to consider how direct experiences with nature and environmental investigation may influence their own perceptions and environmental awareness.

Learning Unit 6: Evaluation Tool 3

Practical assessment materials

MATERIAL 1 - INS pre- and post-assessment sheet

ECOTEACH – LU6 / Evaluation Tool 3

Related Hands-On Exercise: Measuring connection using the Inclusion of Nature in Self (INS) scale

Student code: _____

EBL activity: _____

Date: _____

Before the EBL activity

Which image best represents how connected you feel to nature right now?

INS response: _____ / 7

[Insert the original 7-option INS scale graphic here]

After the EBL activity

Which image best represents how connected you feel to nature now?

INS response: _____ / 7

[Insert the original 7-option INS scale graphic here]

Comparison

My response before the activity: _____

My response after the activity: _____

Difference: _____

- ☐ Increased
☐ Stayed the same
☐ Decreased

Important: There is no correct or incorrect result. The purpose is to reflect on whether your perceived connection to nature changed following the experience.

MATERIAL 2 - INS results and student reflection sheet

Student code: _____

EBL activity: _____

My results

Assessment	INS response
Before the EBL activity	____ / 7
After the EBL activity	____ / 7
Difference	____

My reflection

1. Did your response change after the EBL activity?

- ☐ Yes, it increased
☐ No, it stayed the same
☐ Yes, it decreased

2. What part of the EBL experience influenced you most?

3. Do you think the activity changed the way you think or feel about nature? Why or why not?

4. What did you learn about your own relationship with nature?

5. What environmental experience would you like to explore next?

MATERIAL 3 - Group data analysis sheet

Class / Group: _____

EBL activity: _____

Number of participants: _____

Class results:

Student code	Pre-assessment	Post-assessment	Difference
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			

Add additional rows as required.

Group analysis

Number of learners whose score increased: _____

Number whose score remained the same: _____

Number whose score decreased: _____

Average pre-assessment score: _____

Average post-assessment score: _____

What does our data show?

1. What is the main pattern in the class results?

2. Did all learners respond to the EBL experience in the same way?

3. What factors might help explain the results?

4. What conclusions can we reasonably draw from these data?

5. What can we NOT conclude from these data?

Teacher notes

Learning Unit 6: Evaluation Tool 4

EBL evaluation method selection and application tool

Field	Evaluation Tool Information
Target group	Learners aged 15–18 / Teachers and educators
Type of evaluation tool	Evaluation planning tool + Method selection rubric + Evidence analysis and reflection
Evaluation objective	To assess learners' ability to formulate an appropriate evaluation question, explore and compare evaluation methods from the

	NAAEE eeVAL libraries, select a method suited to the purpose and context of an Environment-Based Learning (EBL) activity, and use the selected method to collect and interpret evidence. The tool also assesses learners' ability to justify methodological choices, recognise limitations in the evidence collected and communicate evaluation findings responsibly.
Competences / skills assessed	<u>STEM and evaluation competences</u> ● Formulation of evaluable questions ● Selection of appropriate evaluation methods ● Evidence collection ● Data organisation and interpretation ● Evidence-based reasoning ● Recognition of limitations <u>Environmental competences</u> ● Evaluation of environmental learning experiences ● Understanding of EBL outcomes and impacts ● Reflection on environmental learning ● Evidence-informed environmental decision-making <u>Digital competences</u> ● Online research ● Navigation and use of digital evaluation resources ● Digital data collection, where appropriate ● Data organisation and representation ● Digital communication of findings <u>Transversal competences</u> ● Critical thinking ● Decision-making ● Problem-solving ● Collaboration ● Communication ● Reflective thinking
Tool description	This evaluation tool supports learners and educators in applying the evaluation process developed in Hands-On Exercise 4 – Using the NAAEE eeVAL libraries. Learners begin by identifying an aspect of an EBL experience that they want to evaluate and formulate a clear evaluable question. They then explore relevant methods and resources available through the NAAEE eeVAL libraries and compare possible approaches according to their purpose, target group, available resources, accessibility and type of evidence required.

	After selecting an appropriate method, learners adapt and apply it to collect evidence from the EBL activity. The resulting information is organised and analysed to identify patterns, findings and possible limitations. The assessment focuses on the quality of the evaluation question, appropriateness and justification of the selected method, evidence collection and interpretation, recognition of limitations and communication of conclusions.
Evaluation criteria / indicators	<u>Criterion 1 – Formulation of the evaluation question</u> 4 – Excellent; formulates a clear, focused and realistically evaluable question that is directly connected to the selected EBL experience and its intended outcomes. 3 – Good; formulates an appropriate evaluation question with only minor improvements needed in focus or clarity. 2 – Satisfactory; formulates a basic question but requires guidance to make it sufficiently clear or evaluable. 1 – Needs improvement; the question is unclear, too broad or cannot realistically be evaluated with the available evidence. <u>Criterion 2 – Exploration and comparison of evaluation methods</u> 4 – Excellent; explores several relevant methods and thoughtfully compares their purpose, evidence requirements, accessibility, advantages and limitations. 3 – Good; explores and compares appropriate methods and identifies their main characteristics. 2 – Satisfactory; considers a limited number of methods or requires support to compare their suitability. 1 – Needs improvement; shows limited exploration or understanding of available evaluation methods. <u>Criterion 3 – Selection and justification of the evaluation method</u> 4 – Excellent; selects a highly appropriate method and provides a clear, evidence-based justification linked to the evaluation question, learners and educational context. 3 – Good; selects an appropriate method and provides a reasonable justification. 2 – Satisfactory; selects a generally suitable method but provides limited justification. 1 – Needs improvement; the selected method is poorly matched to the evaluation question or context. <u>Criterion 4 – Application and evidence collection</u>

	4 – Excellent; applies the selected method systematically and appropriately and collects relevant, sufficient and well-organised evidence. 3 – Good; applies the method appropriately and collects relevant evidence with only minor omissions. 2 – Satisfactory; applies the method with some support and collects basic evidence. 1 – Needs improvement; shows significant difficulty applying the method or collecting useful evidence. <u>Criterion 5 – Analysis, interpretation and limitations</u> 4 – Excellent; analyses the evidence carefully, identifies meaningful findings and clearly recognises limitations and alternative interpretations. 3 – Good; interprets the evidence appropriately and recognises some relevant limitations. 2 – Satisfactory; provides a basic interpretation but requires guidance to identify limitations. 1 – Needs improvement; draws unsupported conclusions or demonstrates limited interpretation of the evidence. <u>Criterion 6 – Communication and reflection</u> 4 – Excellent; communicates the evaluation process and findings clearly and responsibly and provides thoughtful reflection on what was learned from the evaluation. 3 – Good; communicates findings clearly and provides appropriate reflection. 2 – Satisfactory; communicates basic findings but provides limited explanation or reflection. 1 – Needs improvement; findings are unclear, incomplete or insufficiently connected to the evidence.
Methodology / application	The teacher introduces the purpose of evaluation and explains the difference between carrying out an EBL activity and evaluating its learning process or outcomes. Learners identify an aspect of an EBL experience that they would like to evaluate. Individually or in small groups, learners formulate a clear and manageable evaluation question. Learners explore relevant evaluation approaches and resources within the NAAEE eeVAL libraries. Using <u>Material A – Evaluation method selection sheet</u>, they compare possible methods according to the evaluation question,

	target group, evidence required, accessibility, resources and limitations. Learners select one method and justify why it is appropriate for their evaluation purpose and context. The selected method is adapted where necessary and applied to collect evidence. Learners organise the information collected and analyse the results using <u>Material B – Evidence analysis and interpretation sheet</u>. Learners identify key findings while considering limitations and avoiding conclusions that are not supported by the available evidence. Results are communicated through a short written, oral, visual or digital presentation. The teacher uses <u>Material C – Evaluation process assessment rubric</u> to assess the overall process.
Inclusion and accessibility	Evaluation questions and methods should be selected with the characteristics and needs of participating learners in mind. Students may work individually, in pairs or in small groups and assume different roles such as researcher, method reviewer, data recorder, analyst or presenter. Teachers may preselect a small number of suitable eeVAL methods where navigating the complete resource would create unnecessary cognitive or language barriers. Evaluation methods should be adapted where necessary through simplified language, visual supports, oral responses, accessible formats or alternative ways of collecting evidence. Learners should understand that different evaluation methods provide different kinds of evidence and that no single method captures every aspect of an EBL experience. Any personal information collected should be treated appropriately, and anonymous or aggregated data should be used where possible.
Digital tools / resources	● NAAEE eeVAL ● Spreadsheet tools, where appropriate ● Digital survey or form tools, where appropriate ● Presentation or visualisation tools ● Computer, tablet or other internet-enabled device ● NAAEE eeVAL resources ● Evaluation method selection sheet (see Materials)

	● Evidence analysis and interpretation sheet (see Materials) ● Evaluation process assessment rubric (see Materials)
Expected outcomes / usefulness	This evaluation tool introduces learners to evaluation as a structured process rather than simply as a final judgement of an activity. It develops their ability to move from an evaluation question to method selection, evidence collection, analysis and responsible interpretation. Learners also develop an understanding that the quality of an evaluation depends on the relationship between the question being asked, the method selected and the evidence collected. The tool supports critical thinking, data literacy and reflective practice and can help educators introduce participatory evaluation into EBL activities in an accessible and practical way.

Learning Unit 6: Evaluation Tool 4

Practical assessment materials

MATERIAL 1 - Evaluation method selection sheet

ECOTEACH – LU6 / Evaluation Tool 4

Related Hands-On Exercise: Using the NAAEE eeVAL libraries

Student / Group: _____

EBL activity being evaluated: _____

Date: _____

1. What do we want to evaluate?

Our evaluation question:

2. What evidence do we need?

- ☐ Learners' knowledge or understanding
- ☐ Skills or competences
- ☐ Attitudes or perceptions
- ☐ Participation or engagement
- ☐ Behaviour or actions

- ☐ Connection to nature
☐ Other: _____

3. Comparing possible methods

Evaluation method	What evidence could it provide?	Advantages	Possible limitations	Suitable for our evaluation?
Method 1: _____				☐
Method 2: _____				☐
Method 3: _____				☐

4. Our selected method

Method selected:

Why is this method appropriate for our evaluation question?

Who will participate?

When will the evidence be collected?

How will the evidence be collected?

5. Inclusion and accessibility

Does the method allow everyone to participate?

- ☐ Yes
☐ Partly
☐ No

What adaptations may be needed?

MATERIAL 2 - Evidence analysis and interpretation sheet

Evaluation question:

Evaluation method used:

Number of participants / observations: _____

Evidence collected:

Evidence / result	What does it show?
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____

Analysing our findings

1. What is the most important finding?

2. Did we identify any patterns or differences?

3. Does the evidence help answer our evaluation question? Explain.

4. Was there anything unexpected in the results?

Thinking about limitations

5. What limitations did our evaluation have?

- ☐ Small number of participants
- ☐ Limited time
- ☐ Limited evidence
- ☐ Some participants did not respond
- ☐ The method did not measure everything we wanted
- ☐ Accessibility or participation difficulties
- ☐ Other: _____

Explain:

Conclusion

What can we reasonably conclude from the evidence?

What can we NOT conclude from the evidence?

What would we change if we carried out the evaluation again?

Evaluation process assessment rubric

Student / Group: _____

EBL activity: _____

Teacher / Educator: _____

Date: _____

Assessment criterion	Excellent (4)	Good (3)	Satisfactory (2)	Needs improvement (1)	Comments / evidence
Evaluation question is clear and realistically evaluable	☐	☐	☐	☐	
Relevant evaluation methods are explored and compared	☐	☐	☐	☐	
Selected method is appropriate and clearly justified	☐	☐	☐	☐	
Inclusion and accessibility are considered when selecting/adapting the method	☐	☐	☐	☐	
Evidence is collected systematically and appropriately	☐	☐	☐	☐	
Evidence is clearly organised	☐	☐	☐	☐	
Findings are appropriately interpreted	☐	☐	☐	☐	
Limitations of the evaluation are recognised	☐	☐	☐	☐	
Conclusions are supported by the evidence collected	☐	☐	☐	☐	
Evaluation process and findings are communicated clearly	☐	☐	☐	☐	

Overall score

Total score: ____ / 40

Teacher feedback

Strengths

Areas for improvement

Suggested next step

Student reflection

One thing I learned about evaluation:

One thing I would do differently next time:

5. Final Remarks

The ECOTEACH Evaluation Methods and Tools provide a practical framework for assessing learning processes, competences and outcomes within Environment-Based Learning (EBL). Across the six Learning Units, the tools support teachers and educators in collecting evidence, monitoring learners' progress and encouraging reflection on STEM learning and environmental experiences.

The collection is designed as a flexible and adaptable resource rather than a fixed assessment system. Teachers and educators can select and adapt the evaluation tools according to their learners, educational context and available resources, combining different approaches such as observation, self-assessment, peer assessment, reflection, rubrics and data-based evaluation. Particular attention is given to inclusive and accessible assessment practices that recognise different ways of participating and demonstrating learning.

Together with the other resources of the ECOTEACH Virtual Classroom, the Evaluation Methods and Tools contribute to making Environment-Based STEM education more reflective, evidence-based, inclusive and responsive to learners' needs, particularly in disadvantaged and diverse educational contexts.

