ACCESS 2.0

Climate Decoded:

Microcertification Scheme for Teachers

A complete reference to the Climate Decoded microcertification pathway, badge criteria, and Open Badges standards

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Acquisition of a Critical Approach to Environmental Issues in School Education | 2023-1-CZ01-KA220-SCH-000155271

Table of Contents

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Introduction

The ACCESS 2 project (Acquisition of a Critical Approach to Environmental Issues in School Education) aims to help secondary school students build the critical thinking skills needed to understand climate change issues and spot environmental misinformation. The project provides secondary school teachers with innovative and effective tools to foster environmental critical thinking skills in their students, and innovative educational resources - namely, digital microlessons and an interactive learning path for students.

Within this interactive learning path, the project provides a microcertification program (Climate Decoded) accessible through its online platform. Microcertifications serve as digital badges awarded to students upon the successful completion of quizzes and learning milestones. Each badge has been designed individually with reference to the IMS Global's Open Badges 2.0 standards, ensuring that student achievements are formally recognised and transferable.

This document provides all the information you need to know about the Climate Decoded microcertification process, detailing the structure, standards, and information conveyed through the open badges. Additionally, it introduces the purpose and significance of Open Badges, supported by insights from leading resources.

About IMS Global and its Standards

The IMS Global Learning Consortium, now known as 1EdTech Consortium, is a transformative force in the advancement of digital education technology. Since its establishment in 1997, it has been dedicated to fostering interoperability and accessibility in educational tools by developing open standards that enable seamless integration across diverse platforms. By facilitating collaboration among educational institutions, technology providers, and other stakeholders, IMS Global ensures that digital tools and systems work cohesively, creating a more efficient, personalised, and engaging learning experience.

A cornerstone of IMS Global's work is the development of open standards that transcend traditional boundaries in education. Among its most recognised achievements is the Open Badges initiative, a standard that revolutionises how learning outcomes are recognised and shared. Open Badges allow for the creation, verification, and distribution of digital credentials that represent specific skills, knowledge, or achievements. These badges are secure, portable, and universally recognised, empowering learners to showcase their accomplishments across educational, professional, and personal contexts. For example, individuals can share badges on professional networks or include them in applications and portfolios, providing verifiable proof of their competencies.

Another key innovation is the Learning Tools Interoperability (LTI) standard, which enables seamless integration of third-party tools into Learning Management Systems (LMS). By simplifying this process, IMS Global ensures that educators and learners can access a wide range of digital resources without the need for separate workflows or logins. This enhances the functionality of LMS platforms, creating a more streamlined experience that supports effective teaching and learning.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

The standards developed by IMS Global are widely adopted by educational institutions, organisations, and governments worldwide, underscoring their reliability and universal applicability. Institutions use these frameworks to certify student achievements, align with industry standards, and deliver education that meets the demands of a rapidly evolving world. Corporate training programs also benefit from these standards by validating skills and competencies essential in the modern workforce.

For these reasons, the ACCESS 2 project greatly benefited from IMS Global's contributions and used it as a reference to ensure that there is validity in the learning achievements in their microlessons.

What is an Open Badge?

Open Badges are a type of digital credential that recognises individuals' skills, knowledge, and achievements. They are universally recognised and adaptable to the various digital ecosystems, which ensure that the learners' accomplishments are easily shared and verified.

Open Badges bring multiple benefits to educational projects like ACCESS 2. They allow students to engage in self-paced learning. They provide visual proof of achievements, which can also motivate students to progress and continue their journey. A Badge is also a method of recognising specific skills as well as adding depth to traditional assessment. In addition to this, making the badges digital means that they can be shared and are easily portable in different platforms, which adds a value to students' profiles.

Our project, ACCESS 2, has created the Climate Decoded digital badges modelled on Open Badge standards to validate the students' knowledge in the different topics within the project. They offer a robust way to track students' learning journey, which is beneficial for both the student and the teachers. It is also a form of encouragement for students through a modular and motivational certification process.

Understanding Badge Metadata

Metadata in Open Badges is the backbone of digital credentialing, embedding essential information within each badge that makes it verifiable and credible. According to *badge.wiki*, Open Badge metadata comprises details about the badge class, assertion, and profile, each serving a specific purpose.

Badge metadata provides critical information, including:

- Badge Class: defines what the badge represents, including its name, description, and criteria.
- Assertion: authenticates the issuance of the badge by recording the date issued, evidence, and narrative explaining the badge's purpose.
- Profile: Contains information about the issuer, such as name, contact details, and organisational affiliation.

Badge Class: Components and Importance

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

The Badge Class encompasses the essential identity of each badge, outlining its core attributes. According to *Badgecraft*, this component includes:

- Name: a concise title indicating the badge's purpose, such as 'Certified Climate Decoder'.
- Description: an explanation of what the badge represents, highlighting the skills or competencies demonstrated by the recipient.
- Image: visual representation or icon that visually symbolises the badge's meaning.
- Criteria: specific requirements for earning the badge, such as achieving a quiz score of 75% or higher.
- Alignment: links the badge to broader educational standards, making it relevant beyond the immediate context.
- Tags: keywords associated with the badge topic, such as 'sustainability' or 'recycling.'

In the Climate Decoded platform, each digital certification has been carefully structured to reflect students' achievements, making the learning outcomes tangible and visually identifiable.

Assertion: Verification and Validation

The Assertion element verifies that the badge was awarded based on documented achievements. Assertions add an additional layer of transparency by recording specific data:

- Date Issued: specifies the date the badge was awarded, allowing for chronological tracking.
- Evidence: documentation supporting the badge, such as topics completed.
- Narrative: a descriptive explanation that highlights the criteria met by the recipient.

These assertions reinforce the credibility of the badge. For Climate Decoded, these assertions confirm that students have met learning milestones and are ready for advanced topics in critical thinking on environmental issues.

Profile: Issuer and Recipient Information

The Profile section provides details about the issuer and recipient, ensuring transparency and traceability. The profile includes:

- Name: full name of the recipient, providing clear identification.
- Affiliation: organisation or institution associated with the badge issuance, in this case, ACCESS 2 project partners.

In the Climate Decoded platform, badge issuance is centrally coordinated to ensure consistency, accuracy, and structure based upon Open Badges 2.0 standards. The official issuer of all badges is the **ACCESS 2 Project Coordinator (ProEduca)**. This arrangement guarantees that badge metadata, validation processes, and issuance procedures are aligned with project-wide quality standards. Within the “Issuer Profile” metadata, the issuing organisation is presented as:

- **Name of the Issuer:** ProEduca, on behalf of the ACCESS2 Project Team
- **Type of Organisation:** Erasmus+ Project Partnership (School Education)

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- **Issuer website:** www.proeduca.cz
- **Issuer Contact:** info@proeduca.cz

Partner schools and organisations have contributed to the design of learning material and the review of quizzes, but the issuing authority remains centralised. This ensures uniformity in the badge verification chain and strengthens the credibility and traceability of all Climate Decoded digital credentials.

Technical Implementation of Badge Issuance

Students access the Climate Decoded online platform through individual registration. For the registration, the system requires first name, last name, a valid email address, country, and the password.

The registration ensures that each badge is linked to a distinct learner identity in compliance with the Open Badges 2.0 specification. Moreover, the platform integrates an automated tracking mechanism that records:

- completion of each microlesson quiz
- scores obtained
- the date and time of completion
- whether the student meets the minimum achievement threshold defined for ACCESS 2 (a score of 75% achieved in the final microlesson quiz)

These data points are stored in the learner's secure profile and are used to trigger badge eligibility checks at milestone thresholds (3 full topics completed, 6 full topics completed, 10 full topics completed).

Badge issuance is performed automatically once a student meets the required criteria. Once the criteria has been met, the following is generated:

- A digital badge with embedded metadata, available for download as a PNG file. The metadata includes the badge name, description, issuer information, as well as the criteria met by the student.
- A shareable link to a unique microcertification page with all relevant metadata visible. The metadata includes the following:
    - Name of badge
    - Visual representation of badge
    - Issue date
    - All topics completed
    - Description of completed topics (see the *Description Metadata* section for full descriptions of each topic)
    - Related EU GreenComp skills related to completed topics
    - Keywords related to completed topics

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- All issuer information

These become immediately visible in the dedicated “Get Your Badges” page within the students’ dashboard and can be downloaded or shared.

Microcertification System of the ACCESS 2 Project

The Climate Decoded platform implements a structured microcertification pathway to recognise and validate students’ learning in environmental issues and sustainability, with a critical thinking approach. Hosted on the project’s dedicated online platform, this system provides an integrated learning and microcertification journey that combines digital lessons, reinforcement activities, and quizzes. The approach encourages students to engage deeply with environmental topics while providing verifiable recognition of their achievements.

The Climate Decoded microcertification system assesses and validates student learning across three levels. Each level represents a progressive milestone in understanding and critically analysing environmental issues, encouraging students to deepen their knowledge and engage with the material at an increasing depth.

Through this microcertification framework, Climate Decoded adopts a modern, inclusive approach to environmental education. Digital badges offer structured, meaningful credentials that acknowledge student progress, motivate continued engagement, and cultivate environmental awareness. This system emphasises skills and understanding that go beyond traditional assessment metrics, preparing learners to adopt critical and informed approaches to contemporary environmental challenges.

As education increasingly incorporates digital methodologies, the ACCESS 2 project demonstrates how microcertifications can empower students and bridge gaps in learning. By modelling on widely recognised standards, Climate Decoded sets a precedent for educational programs to follow, blending technical rigor with pedagogical innovation. It also ensures that learners’ achievements are verifiable, shareable, and portable, allowing recognition both within and beyond the classroom. Finally, the microcertification system fosters a sense of accomplishment, reinforcing the importance of sustainable behaviours and knowledge in everyday life.

The Climate Decoded microcertification pathway consists of the following elements:

Digital Microlessons for Core Topics

Each of the 10 Core Topics in the Climate Decoded program is presented through a series of short, focused digital microlessons, designed to introduce key environmental concepts and foster critical thinking. These microlessons are self-contained units (short videos, digital infographic, posters, presentations, comic books) that can be completed independently, allowing learners to progress at their own pace. The content is interactive and designed to engage students in exploring real-world

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

environmental challenges, from climate change and biodiversity loss to sustainable consumption and circular economy principles.

Reinforcement Activities and Microlesson Quizzes

Following each microlesson, learners will engage in reinforcement activities and quizzes aimed at consolidating their understanding of the key message of the lesson. For each microlesson, there is an interactive activity and a quiz. The activities are short and interactive (Drag & Drop or Memory Games, Crosswords, or Fill-in-the-gap exercises), while quizzes are multiple choice. These reinforcement activities bridge the gap between passive knowledge acquisition and active skill development, with a special focus on the development of critical thinking and identification and debunking of misinformations about environmental issues, preparing students to demonstrate mastery in the end-of-topic quizzes.

End-of-Topic Quizzes, Microcertification and Digital Badges

At the conclusion of each core topic, learners will complete a quiz consisting of 8 questions, assessing their comprehension and critical understanding. Quizzes are designed to test not only recall of facts, but also the ability to apply knowledge to problem-solving scenarios related to environmental challenges. In total, there are 10 End-of-Topic Quizzes (one for each core topic) of 8 questions each. In order to pass the End-of-Topic quiz, the student must score a minimum of 75%.

The Climate Decoded microcertification system consists of three badges, so three levels of critical thinking mastery of environmental issues. These badges are modelled on the Open Badge standard, ensuring they are verifiable, shareable, and portable.

Badge Levels: A Step-by-Step Achievement Journey

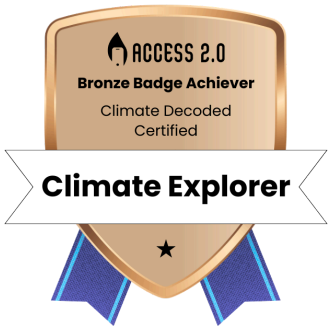
The Climate Decoded microcertification system uses a tiered approach, where learners accumulate badges to reflect increasing levels of expertise and commitment to environmental literacy. The three badge levels are:

1. Bronze Badge: Climate Explorer

- **Achievement:** awarded after passing any **3 End-of-Topic quizzes.**
- **Significance:** marks the learner's initial progress in understanding environmental issues. The Bronze Badge encourages early engagement and celebrates foundational knowledge in critical environmental topics.
- **Learner impact:** provides motivation to continue learning and reinforces the habit of completing structured environmental learning modules.

This is what the Bronze Badge will look like:

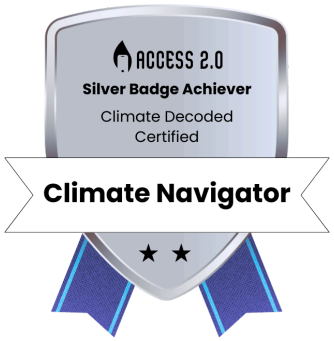
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



2. Silver Badge: Climate Navigator

- **Achievement:** awarded after passing any **6 End-of-Topic quizzes**
- **Significance:** demonstrates intermediate mastery and deeper understanding of interconnected environmental challenges. The Silver Badge reflects the learner's growing ability to think critically and apply knowledge across multiple topics.
- **Learner impact:** serves as a recognition of sustained effort, reinforcing confidence and readiness to tackle more complex environmental issues.

This is what the Silver Badge will look like:



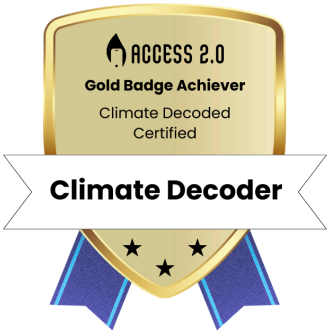
3. Gold Badge

- **Achievement:** awarded after passing **all 10 End-of-Topic quizzes**
- **Significance:** represents comprehensive mastery of the ACCESS 2 curriculum. The Gold Badge acknowledges the learner's ability to integrate knowledge, analyse environmental challenges, identify misinformation and myths about climate change, and propose informed solutions.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

- **Learner impact:** functions as a prestigious credential that can be shared digitally to demonstrate environmental literacy and critical thinking skills, both in academic settings and beyond.

This is what the Gold Badge will look like:



Badge Validity and Re-takes

The Climate Decoded microcertification system is designed to support student learning, ensuring fairness, flexibility, and reliability. Students may retake each End-of-Topic quiz an unlimited number of times. This encourages mastery learning and reduces performance anxiety. To qualify for badge progression, students must achieve at least 75% correct answers in each of the 8-question End-of-Topic quizzes. There is no predefined time limit for completing the 3, 6, or 10 quizzes needed to obtain Bronze, Silver, and Gold badges. Students can progress at their own pace, consistent with self-directed learning principles. All Climate Decoded badges are permanently valid. They do not expire and remain verifiable through the platform's persistent issuer record.

Using and Sharing Your ACCESS 2 Badges

The Climate Decoded badges are modelled on the Open Badges 2.0 metadata structure, enabling flexible use across multiple digital environments. Each badge can be downloaded as a **PNG image with embedded metadata**, and each student will also receive a unique link to the microcertification page, ensuring compatibility with recognised badge repositories and allowing students to share their badges digitally, for example on school websites, class blogs, or Open Badge Passport and similar credentialing platforms.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

GDPR Compliance and Data-handling

The Climate Decoded microcertification system complies with the General Data Protection Regulation (EU 2016/679). Student data is processed solely for educational and certification purposes and is not shared with third parties outside the project consortium. Specifically:

- **Personal data stored in badge/microcertification page metadata** includes only the learner's name or pseudonym, date of issuance, and achievement record.
- **No sensitive personal data** (special categories under GDPR) are included in badge metadata.
- **Data retention:** learner data and microcertification assertions are stored for the duration of the ACCESS 2 project and will remain accessible on the platform for at least three years after project completion, following Erasmus+ guidelines.
- **Access control:** only authorised platform administrators and the badge issuer have access to student achievement data.
- **Rights of students:** students may request correction or deletion of their data, except where retention is required for verification of already issued badges.

This ensures that the microcertification system remains both transparent and fully compliant with European data protection legislation.

Help and Support

To ensure smooth use of the microcertification platform, ACCESS 2 provides structured support channels for both students and teachers using the Climate Decoded platform. If a badge does not appear after completing a quiz:

1. Refresh the student dashboard.
2. Verify that the quiz score meets the minimum requirement.
3. Check that all mandatory quizzes for the level have been completed.
4. If the issue persists, contact platform support.

Technical Support Contacts:

- **Primary Contact:** info@proeduca.cz
- **Technical Support:** access2@dcnet.eu

Reporting Errors:
Teachers may report quiz errors (incorrect scoring, duplicated questions, broken links) through the official email contact.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Conclusion

The ACCESS 2 project's Climate Decoded microcertification scheme is *built on the principles of* IMS Global's Open Badge standards, demonstrating a forward-thinking approach to environmental education. By utilising digital badges, Climate Decoded provides a robust framework for recognising and validating students' achievements in a manner that is secure, verifiable, and universally transferable. These digital credentials ensure that learners' accomplishments are not only acknowledged but also portable across diverse educational, professional, and geographical contexts. This microcertification process enhances the value of students' learning experiences by offering tangible, meaningful proof of their skills and knowledge, empowering them to showcase their competencies in impactful ways.

The implementation of microcertifications within the Climate Decoded program has the added benefit of motivating students to engage actively in their learning journey. The opportunity to earn digital badges creates a sense of achievement and progression, encouraging learners to deepen their understanding and critical thinking skills about environmental issues and climate change impact. Moreover, by linking these badges to the broader context of global sustainability efforts, Climate DEcoded fosters an enduring commitment to environmental stewardship. This approach helps secondary school students connect theoretical knowledge with practical applications, equipping them to analyse and address real-world challenges and contribute to a sustainable future.

As education increasingly embraces digital methods, projects like ACCESS 2 highlight the transformative potential of microcertifications in bridging knowledge gaps and promoting lifelong learning. The integration of digital credentials not only democratises access to recognition and learning opportunities but also inspires a new generation of learners to take ownership of their roles as responsible stewards of the planet. By embedding these principles into education through innovative technologies, ACCESS 2 sets a powerful example for how microcertifications can drive both individual empowerment and collective progress toward a more sustainable and equitable world.

Description Metadata

The table below sets out the descriptive metadata associated with each core topic. These details will be displayed on a student's personalised microcertification page after they have fulfilled the requirements for receiving the microcertification.

Core Topic	Description	Related EU GreenComp Skills	Keywords
The Greenhouse Effect and Global Warming	The completion of this topic recognises learners who understand one of the core scientific foundations of climate change: how the greenhouse effect works and how human activities have intensified it. By completing this topic, the learner can	**1.1 Valuing sustainability** Understanding why protecting a stable climate is essential for the wellbeing of people, ecosystems, and future generations. **2.1 Systems thinking** Seeing the greenhouse effect as part of the interconnected	Greenhouse effect, Global warming, Climate change, Climate science, Scientific consensus.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	explain why the natural greenhouse effect is essential for sustaining life on Earth, describe the consequences of its human-driven enhancement, and identify the measurable signs of global warming in today's world. The badge demonstrates the learner's ability to interpret scientific information and recognise the impacts of global warming on weather systems and ecosystems. It also signifies that the learner can engage with evidence-based scientific consensus, showing competence in distinguishing reliable information from misinformation.	Earth system (atmosphere–oceans–biosphere), and understanding how human activities disrupt this balance. **2.2 Critical thinking** Evaluating scientific evidence, understanding the scientific consensus on global warming, and distinguishing reliable information from misinformation. **2.3 Problem framing** Identifying global warming as a sustainability challenge, understanding who is affected, what causes it, and recognising the need for mitigation and adaptation responses. **3.1 Futures literacy** Considering how present-day greenhouse gas emissions shape future climate scenarios and how action today influences long-term outcomes.	
Climate Change vs. Weather Variability	Upon completion of this topic, learners can clearly distinguish between short-term weather variability and long-term climate change, and understand why this distinction is essential for interpreting climate science. After completing this topic, learners understand that climate change is driven by long-term shifts in the Earth's climate system while weather describes day-to-day atmospheric conditions. Additionally, learners can understand that isolated weather events do not prove or disprove climate change, yet trends such as more frequent extreme weather events are consistent with	**1.1 Valuing sustainability** Understanding why long-term climate stability is vital for social wellbeing, ecosystems, and future generations. **2.1 Systems thinking** Understanding how climate and weather are connected but distinct, and how complex interactions in the climate system influence long-term trends. **2.2 Critical thinking** Evaluating evidence by distinguishing between weather events and climate trends, and understanding why extreme events align with climate projections. **2.3 Problem framing** Identifying long-term climate change as an overarching sustainability challenge that affects regions, communities,	Climate change, Weather variability, Climate models, Long-term trends, Earth systems.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	scientific expectations. They can describe how climate models differ from weather forecasts, why climate models are based on complex Earth-system interactions, and how even small increases in global temperature can significantly change climate patterns, sea level, and ecosystems.	and natural systems differently. **3.1 Futures literacy** Understanding how climate models predict future scenarios and how these projections guide planning for sustainable, resilient futures.	
Causes of Climate Change	After successfully completing this topic, learners understand the main human-driven and natural factors that contribute to modern climate change. Learners can explain how burning fossil fuels releases large amounts of carbon dioxide and other greenhouse gases, why deforestation reduces the planet's capacity to absorb CO_2, and how sectors such as agriculture and industry contribute significant methane, nitrous oxide, and fluorinated gases. Learners also understand that while natural processes exist, the recent rapid warming trend is overwhelmingly caused by human activities. They can describe environmental feedback loops - such as melting ice reducing the Earth's reflectivity - and how these processes accelerate global warming.	**1.1 Valuing sustainability** Recognising why reducing emissions and protecting the climate system is essential for current and future wellbeing. **2.1 Systems thinking** Understanding how energy use, agriculture, industry, land use, and natural feedback loops interact within the Earth system to influence global warming. **2.2 Critical thinking** Assessing scientific evidence on greenhouse gas emissions and identifying the human activities driving recent climate change. **2.3 Problem framing** Identifying the causes of climate change as a global sustainability challenge involving multiple sectors, actors, and impacts. **3.1 Futures literacy** Understanding how present-day emissions shape future climate scenarios and why reducing human-caused emissions is essential to achieving sustainable futures.	Greenhouse gases,Fossil fuels, Deforestation, agriculture and industrial emissions, Feedback loops, Albedo effect.
Impacts of Climate Change	Learners who complete this topic can describe the wide-ranging impacts of climate change on the environment, human societies, and natural systems.The learners understand that climate	**1.1 Valuing sustainability** Recognising the importance of protecting human and ecological systems from the negative impacts of climate change for current and future generations. **2.1 Systems thinking**	Climate change impacts, Extreme weather, Biodiversity, Human health, Food and water security.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	change leads to higher global surface temperatures, rising sea levels, and increased frequency and intensity of extreme weather events such as hurricanes, droughts, and heavy rainfall. Learners completing this topic can explain how climate change affects ecosystems and wildlife by altering habitats, food availability, and species interactions. They also understand the consequences for agriculture, including disrupted crop production, increased pests and diseases, and reduced water availability. Additionally, learners recognise the direct and indirect risks to human health, including heat stress, poor air quality, and the impacts of climate-driven changes on food and water security.	Analysing how rising temperatures, sea level changes, extreme weather, and ecosystem disruptions are interconnected within global and local systems. **2.2 Critical thinking** Assessing evidence on climate impacts and understanding the causal links between human activities and observed environmental changes. **2.3 Problem framing** Identifying climate change impacts as complex, multi-dimensional sustainability challenges affecting communities, ecosystems, and economies worldwide. **3.1 Futures literacy** Considering how current climate impacts can shape future environmental and societal conditions, and the importance of planning to prevent or adapt to these outcomes.	
Climate Change and Ocean Systems	Learners completing this topic understand the profound impacts of climate change on the Earth's ocean systems. Learners can explain how rising ocean temperatures, acidification, and reduced oxygen levels are altering marine environments and threatening biodiversity. They understand that rising sea levels jeopardise coastal ecosystems and human settlements, and that changes in ocean currents can influence weather patterns worldwide. Learners can also connect human-induced greenhouse gas emissions to these changes, appreciate the	**1.1 Valuing sustainability** Recognising the importance of protecting oceans for ecological balance, human wellbeing, and the sustainability of global systems. **1.3 Promoting nature** Appreciating the role of oceans in supporting biodiversity and ecosystem health, and understanding human responsibility in restoring and safeguarding marine life. **2.1 Systems thinking** Understanding how ocean temperatures, acidity, oxygen levels, and currents interact with the climate system, affecting both marine and terrestrial environments. **2.2 Critical thinking**	Ocean warming, Ocean acidification, Sea level rise, Ocean currents, Oxygen depletion.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	complex interactions between ocean and climate systems, and recognise the urgency of protecting marine environments.	Assessing scientific evidence on ocean changes, including acidification and biodiversity loss, and identifying the underlying human and natural drivers. **2.3 Problem framing** Identifying the challenges of ocean system degradation as part of a complex sustainability problem affecting multiple regions, ecosystems, and communities.	
Renewable Energy and Mitigation Strategies	Upon completion of this topic, learners are able to understand key mitigation strategies to address climate change. They can explain how renewable energy sources - such as solar, wind, and hydroelectric power - reduce reliance on fossil fuels, a major driver of greenhouse gas emissions. They understand the role of energy efficiency, carbon pricing mechanisms, and sustainable land management in limiting atmospheric CO_2 levels. Learners completing this topic can distinguish between mitigation strategies, which aim to prevent or reduce climate change, and adaptation strategies, which address existing climate impacts. They recognise that effective mitigation requires coordinated action at community, national, and global levels.	**1.1 Valuing sustainability** Recognising the importance of reducing greenhouse gas emissions to protect ecosystems, human societies, and future generations. **2.1 Systems thinking** Analysing how energy production, consumption, land management, and carbon pricing interact within global and local systems to mitigate climate change. **2.2 Critical thinking** Evaluating the effectiveness of renewable energy, carbon pricing, and land-based strategies, and recognising their limitations and challenges. **3.1 Futures literacy** Understanding how adopting renewable energy and other mitigation strategies today shapes more sustainable future scenarios. **4.2 Collective action** Understanding that effective climate mitigation requires coordinated efforts across communities, nations, and global networks.	Renewable energy, Mitigation strategies, Energy efficiency, Carbon pricing, Sustainable forestry and agriculture.
Adaptation Strategies	Upon completion of this topic, learners understand practical strategies for adapting to the impacts of climate change. Successful	**1.1 Valuing sustainability** Understanding the importance of protecting human and ecological systems from climate impacts and ensuring	Climate adaptation and resilience, Resilient infrastructure,

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	learners can explain how adaptation reduces vulnerability and strengthens resilience in communities, ecosystems, and infrastructure. They can describe how resilient infrastructure, adaptive agricultural practices, coastal management, efficient water use, and climate-informed public health systems help societies cope with rising sea levels, extreme weather events, and other climate-related challenges. Learners earning this badge demonstrate the ability to evaluate adaptation measures, consider their effectiveness in different contexts, and connect scientific understanding of climate impacts to actionable solutions.	resilience for current and future generations. **2.1 Systems thinking** Understanding how adaptation strategies across infrastructure, agriculture, water management, and public health interact within complex socio-ecological systems. **2.2 Critical thinking** Assessing the effectiveness of different adaptation measures in various contexts and identifying potential risks or trade-offs. **3.2 Adaptability** Developing the capacity to respond to climate-related uncertainties, anticipate risks, and implement solutions that support long-term resilience. **3.3 Exploratory thinking** Encouraging innovative approaches to adaptation by linking knowledge across disciplines and experimenting with novel strategies.	Agricultural adaptation, Coastal and water management, Public health systems.
Role of Individuals and Societies in Combating Climate Change	Learners completing this topic can understand the critical role that both individuals and societies play in addressing climate change. They can explain how everyday actions - such as reducing energy consumption, recycling, using sustainable transport, and making conscious consumption choices - can collectively contribute to greenhouse gas reduction. They understand that participation in community projects, supporting renewable energy, and advocating for climate policies amplifies impact at local, national, and global levels.	**1.1 Valuing sustainability** Recognising the importance of responsible personal and collective behaviour in supporting sustainable futures. **1.2 Supporting fairness** Understanding that equitable participation and decision-making empower all members of society to contribute to climate action. **2.2 Critical thinking** Evaluating how individual choices and societal systems contribute to climate change and identifying the most effective ways to reduce environmental impacts. **4.2 Collective action** Participating in community, societal, and political initiatives to drive change and	Collective action and individual responsibility, Systemic change, Behavioural change, Community projects, Policy engagement.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	Completing this topic demonstrates the ability to evaluate personal and societal choices, understand their broader environmental consequences, and engage with multiple perspectives in tackling climate change. This topic reflects competence in taking informed action, fostering collaboration, and recognising the interconnectedness of personal behaviours, social systems, and policy frameworks in creating sustainable futures.	improve sustainability outcomes. **4.3 Individual initiative** Applying personal knowledge and skills to reduce environmental impact, educate others, and contribute to sustainable solutions.	
Science Behind Climate Change Predictions	Completion of this topic demonstrates understanding of the scientific foundations of climate predictions. Learners can explain how climate models use historical and current data to forecast long-term trends, incorporating feedback loops, climate sensitivity, and multiple scenarios. They understand how supercomputers process vast datasets to simulate complex interactions in the Earth system, and how models are continually refined as new data and knowledge emerge. Learners completing this topic demonstrate the ability to interpret climate science, critically assess predictive models, and understand how scientific predictions inform policy decisions and climate action.	**1.1 Valuing sustainability** Recognising the importance of reliable scientific knowledge for guiding sustainable decision-making that protects ecosystems and communities. **2.2 Critical thinking** Evaluating the reliability and limitations of climate models and interpreting complex scientific data. **2.3 Problem framing** Recognising climate prediction as a tool for anticipating long-term sustainability challenges and guiding appropriate adaptation and mitigation measures. **3.1 Futures literacy** Using climate scenarios to anticipate possible futures and plan for sustainable outcomes. **3.3 Exploratory thinking** Engaging creatively with scientific tools and data to explore innovative solutions and improve understanding of complex climate systems.	Climate models, Climate predictions, Climate scenarios, Supercomputers , Climate policy.
Biodiversity and Climate Change	Completion of this topic demonstrates understanding of the interconnections between climate change and	**1.3 Promoting nature** Understanding that humans are part of natural systems and have a responsibility to	Biodiversity loss, Species distribution, Coral reefs,

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

	biodiversity. Learners can explain how rising temperatures, changing rainfall patterns, ocean acidification, and melting polar ice affect species distribution, survival, and ecosystem health. They understand the consequences for coral reefs, forests, polar regions, pollinators, and food systems, as well as the broader impacts on human health, food security, and economies. Learners earning this badge can analyse how climate change drives biodiversity loss, evaluate the effectiveness of conservation strategies, and recognise the role of ecosystems in supporting resilient human and environmental systems.	protect, restore, and regenerate ecosystems. **2.1 Systems thinking** Analysing how climate change affects multiple ecosystems, species interactions, and the services they provide to humans. **2.2 Critical thinking** Assessing evidence on climate-driven biodiversity loss and evaluating conservation strategies. **3.2 Adaptability** Recognising the need for adaptive conservation strategies and ecosystem management to respond to climate impacts. **4.2 Collective action** Participating in or supporting conservation initiatives, policy measures, and collaborative efforts to protect biodiversity	forests and polar regions, Conservation, Ecosystems.

Bibliography

1. *IMS Global Learning Consortium. (2023). About IMS Global.* https://www.imsglobal.org/aboutims
2. *IMS Global Learning Consortium. (2023). Open Badges 2.0.* https://www.imsglobal.org/activity/digital-badges
3. *Badgecraft. (2023). Understanding badge metadata.* https://www.badgecraft.eu/en/blog/open-badges/understand-badge-meta-data
4. *Badge Wiki. (2023). A guide to writing open badge metadata.* https://badge.wiki/wiki/A_Guide_to_Writing_Open_Badge_Metadata
5. *Open Badges. (2023). Frequently asked questions.* https://openbadges.org/about/faq
6. *Ellen MacArthur Foundation. (2023). Circular economy in education.* https://www.ellenmacarthurfoundation.org/
7. *Wiggins, G., & McTighe, J. (2005). Understanding by design. ASCD.*
8. *Brown, P. C., Roediger, H. L., & McDaniel, M. A. (2014). Make it stick: The science of successful learning. Belknap Press.*

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Project name: Acquisition of a Critical Approach to Environmental Issues in School Education

Project number: 2023-1-CZ01-KA220-SCH-000155271

Project website: https://www.eco-bits.eu/access2/

Deliverable: Climate Decoded: Microcertification Scheme for Teachers

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.