Co-funded by the European Union

Guiding Secondary Education Girls towards Green Jobs through Challenge-Based Learning

GirlsGoGreen

Project: 2023-2-BG01-KA210-SCH-000185374

Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

Online open-source course for teachers

EDUCATIONAL MATERIAL

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

Platon Schools

Co-funded by the European Union

Project: 2023-2-BG01-KA210-SCH-000185374

ALDA ASSOCIATION

ΕΚΠΑΙΔΕΥΤΗΡΙΑ ΠΛΑΤΩΝ

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Why

Personal Reasons

- Skill Development: Learn cutting-edge practices in sustainable technology and green practices that can be applied both professionally in the classroom and personally at home, such as sustainable gardening or energy conservation techniques.
- Certification of Skills: Achieve formal certification in sustainability education that not only enriches your professional profile but also enhances your credibility and authority as an educator in the field of environmental studies.
- Networking Opportunities: Connect with like-minded professionals and experts in the field of sustainability, which can lead to collaborations and new career opportunities within educational and environmental sectors.
- **Educational Reasons**
- Equips teachers with the tools and methods to effectively teach complex sustainability concepts.
- Enables the integration of interdisciplinary approaches into the curriculum, enriching student learning.
- Prepares students for emerging job markets focused on green technologies and sustainable practices.

Societal Reasons

- Contributes to societal change by educating the next generation on the importance of sustainability and responsible resource use.
- Helps build a more informed and conscientious citizenry that can make thoughtful decisions about the environment.
- Supports national and global goals for sustainable development, aiding in environmental conservation efforts.

Task1 – Skill development course

- Example https://www.futurelearn.com/
- Search and suggest the most relevant/interesting on line course on "Sustainability" (2 points)

Surname/name	School	Course title	Link

Certification of skills

Example : Eco-Schools Green Flag. https://www.ecoschools.global/ This certification is part of the Eco-Schools program, which is an international initiative designed to encourage whole-school action on sustainable development education.

Networking opportunities

Example 1:Education for Climate Coalition https://education-for-climate.ec.europa.eu/community/

Example 2: Blue Schools https://maritime-forum.ec.europa.eu/theme/ocean-literacy-and-blue-skills/ocean-literacy/network-blue-schools_en

Key Aspects of Environmental Sustainability

1. Conservation of Resources: Sustainable management of water, soil, and forests to prevent depletion.

2. Pollution Reduction: Reduce emissions, waste, and pollutants through recycling, renewable energy and green manufacturing.

3. Sustainable Energy: Transition to renewable energy sources like solar, wind and hydroelectric power.

4. Ecosystem Management: Preserve natural habitats via protected areas and wildlife conservation.

5. Economic Sustainability: Foster industries that integrate environmental concerns into economic decisions.

Circular Economy (CE)

is built on three key principles

i. Design Out Waste and Pollution: By redesigning processes and products, waste and pollution are not created in the first place, as materials are designed for reuse or safe return to the environment.

ii. Keep Products and Materials in Use: Products are designed for durability, reuse, remanufacturing and recycling to keep materials circulating within the economy without entering the waste stream.

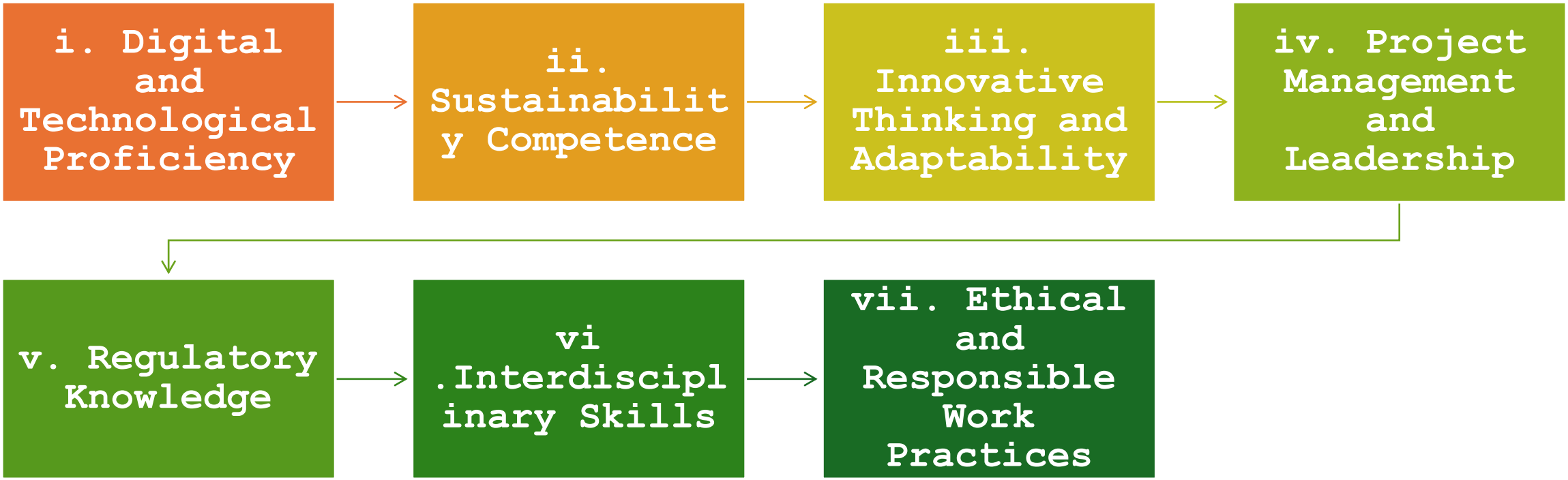
iii. Regenerate Natural Systems: Instead of merely minimizing harm to the environment, the circular economy emphasizes restoring and regenerating natural systems, enhancing the quality and availability of natural resources. This approach fosters resilience and sustainability by aligning economic practices with ecological principles.

Task 2: Design Out Waste and Pollution

- Example: Cradle to Cradle https://c2ccertified.org/
- Search and suggest the most relevant/interesting example of good practice of “Design Out Waste and Pollution” (2 points)

Surname/name	School	Course title	Link

Green and Circular skills for nowadays and future labor market



i. Digital and Technological Proficiency

i.1. Data Analysis

i.1.1 Proficiency in Statistical Software: Ability to use software like R, Python, or SAS for statistical analysis to model environmental data and forecast trends.

i.1.2 Data Visualization Skills: Expertise in creating intuitive visualizations using tools such as Tableau or Power BI to communicate findings effectively to stakeholders.

i.1.3 Quantitative Reasoning: Strong quantitative skills to understand and analyze data related to emissions, resource consumption, and sustainability performance metrics.

i.1.4 Predictive Analytics: Capability to apply machine learning algorithms for predictive assessments and scenario planning, enhancing decision-making processes in resource management and environmental conservation.

i. Digital and Technological Proficiency

i.2. Software Use

i. Digital and Technological Proficiency

i.3. Understanding of Digital Platforms

i.3.1 Collaboration Tools Proficiency: Expertise in using digital collaboration platforms like Slack, Microsoft Teams, or Asana to facilitate remote teamwork and project management.

i.3.2 Cloud Computing Knowledge: Understanding of cloud services like AWS, Google Cloud, or Microsoft Azure, which are pivotal for storing and processing large environmental data sets securely and efficiently.

i.3.3 Digital Literacy in Remote Technologies: Familiarity with remote monitoring technologies and software, crucial for overseeing distributed energy resources or remote conservation areas.

i.3.4 Cybersecurity Basics: Awareness of cybersecurity principles to protect sensitive environmental data, which is increasingly targeted in cyber-attacks.

Task3: Project work for next session

- Set up teams of 2-3
- Choose one skill from the *5. Elaboration on the most needed Green and Circular skills for nowadays and future labor market*
- Prepare an outline of the Job profile as below (10 points)

Job Role	
Objective	
Company	
Required Qualifications & Skills	
Responsibilities	
Salary	

Example

Job Role	Environmental Data Scientist – Related to: i. Digital and Technological Proficiency i.1. Data Analysis – i.1.4 Predictive Analytics
Objective	To develop a predictive analytics system using machine learning to forecast air quality levels in urban areas. This system aims to provide early warnings and actionable insights for both public health officials and residents.
Company	GreenTech Analytics: is a sustainability-focused tech firm that specializes in developing advanced environmental monitoring solutions. They partner with municipal governments and environmental agencies to improve urban living conditions through technology.
Required Qualifications & Skills	Qualifications: Education- Master's degree in Environmental Science, Data Science, or a related field. Skills: Proficiency in Python or R for data analysis and machine learning. Experience with machine learning libraries such as TensorFlow or Scikit-Learn. Strong understanding of statistical modeling and data mining techniques. Knowledge of geographic information systems (GIS) and remote sensing data. Ability to interpret complex datasets and convert them into actionable insights.
Responsibilities	Develop and refine predictive models for air quality based on historical data and real-time inputs. Collaborate with software developers to integrate these models into user-friendly applications. Conduct scenario analysis to assess potential outcomes of various pollution control measures. Present insights and recommendations to stakeholders and policy makers.
Salary	Depending on the region, the typical salary for an Environmental Data Scientist with a specialization in predictive analytics can range from €70,000 to 120,000 annually.

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

The educational content of the training course include materials as follows:

1.Key aspects of the Environmental Sustainability (ES) and Circular Economy (CE) and required nowadays and future job market skills

2.Introduction to the Integrated Science Technology Engineering and Math (I-STEM) methodology with focus on green skills for girls and online Green STEM Curricula Design Tool

3.The Co-Creation Challenge Based Learning (CCC_BL) approach in the context of Environmental Sustainability

4.The Qualifications Based Career Guidance (Q_BCG) on Circular Economy

5. An elaboration on the most needed Green and Circular skills for nowadays and future labor market

6. Indicative learning scenarios (formal and informal learning) supporting teachers in designing their I-STEM in the context of Environmental Sustainability and Circular Economy lesson plans

It will cover 12 educational hours and will be open-source educational material.

1.Key aspects of the Environmental Sustainability and Circular Economy and required nowadays and future job market skills

1.1 Environmental Sustainability (ES)

ES focuses on managing natural resources to meet current needs without compromising the ability of future generations to meet their own. It encompasses several key aspects:

i. Conservation of Resources

This involves the sustainable management and use of natural resources like water, soil, and forests to prevent depletion and maintain biodiversity.

ii. Pollution Reduction

Reducing emissions, waste, and chemical pollutants to protect air, water, and soil quality. Initiatives include recycling, renewable energy adoption, and green manufacturing processes.

iii. Sustainable Energy

Transitioning from fossil fuels to renewable energy sources such as solar, wind, and hydroelectric power to reduce carbon footprints and mitigate climate change.

iv. Ecosystem Management

Preserving ecosystems through protected areas and wildlife conservation, ensuring that natural habitats and the species they support can thrive.

v. Economic Sustainability

Integrating environmental concerns into economic decisions to foster industries that do not harm the environment, thus supporting long-term ecological balance.

1.2 Circular Economy (CE)

CE is a systemic approach to economic development designed to benefit businesses, society, and the environment. It is built on three key principles:

i.Design Out Waste and Pollution

By redesigning processes and products, waste and pollution are not created in the first place, as materials are designed for reuse or safe return to the environment.

ii. Keep Products and Materials in Use

Products are designed for durability, reuse, remanufacturing, and recycling to keep materials circulating within the economy without entering the waste stream.

iii. Regenerate Natural Systems

Instead of merely minimizing harm to the environment, the circular economy emphasizes restoring and regenerating natural systems, enhancing the quality and availability of natural resources. This approach fosters resilience and sustainability by aligning economic practices with ecological principles.

1.3.Nowadays and future job market Green Skills

The evolving job market increasingly emphasizes skills required for a sustainable, green economy. The key skills and qualifications needed for green jobs focus on both technical abilities and a broad understanding of environmental challenges and solutions. Here's an overview of crucial skills for today's and future green job markets:

i. Digital and Technological Proficiency

As green jobs integrate digital technologies, skills in data analysis, software use, and understanding of digital platforms are essential. Workers must be adept with technologies that improve energy efficiency or environmental monitoring, and those that enable remote and flexible working arrangements.

ii. Sustainability Competence

A deep understanding of sustainability, including the ability to assess and implement practices that support ecological balance, is paramount. This involves knowledge of renewable energy systems, waste reduction, and sustainable resource management.

iii. Innovative Thinking and Adaptability

The ability to innovate and adapt to new processes or methods that minimize environmental impact is crucial. Workers must be open to continuous learning and adapting their skills to align with evolving technologies and industry standards.

iv. Project Management and Leadership

Leadership skills that include project management, particularly in projects related to ecosystem restoration or sustainable infrastructure, are increasingly in demand. Effective communication and the ability to lead diverse teams are critical in managing complex projects with sustainability goals.

v. Regulatory Knowledge

Understanding environmental laws, sustainability regulations, and compliance standards at local, national, and international levels is necessary. This ensures that practices and projects not only aim for sustainability but also adhere to required legal frameworks.

vi .Interdisciplinary Skills

The nature of green jobs often requires a combination of skills across various fields such as engineering, environmental science, business management, and economics. This interdisciplinary approach is vital for addressing complex environmental issues effectively.

vii. Ethical and Responsible Work Practices

Commitment to ethical practices and a drive to achieve social equity in all operations. This includes promoting workplace diversity, ensuring fair labor practices, and striving for economic activities that do not harm the environment.

These skills are critical not only for adapting to the green economy but also for driving its growth. Educators and policymakers need to integrate these competencies into curricula and training programs to prepare the workforce for future challenges and opportunities in the green sector.

1.4 Green Drivers of change

Key drivers of change related to the green transition, include:

i. Clean Electrification

This focuses on replacing carbon-intensive processes with electrified alternatives powered by decarbonized energy sources. It highlights the role of electrification in reducing emissions by replacing traditional combustion engines in vehicles with electric ones, and the importance of adjusting electricity grids to integrate renewable energy sources efficiently.

ii. Resource Efficiency

Emphasizes the importance of reducing energy and material consumption. It mentions the role of the circular economy and replacing polluting or carbon-intensive materials with greener alternatives to enhance resource efficiency. This approach supports the decoupling of human well-being from resource use.

iii. Responsible Behaviours

Discusses the need for consumers, businesses, and governments to fundamentally change their behaviors and choices to support the green transition. This includes adopting lifestyles and business practices that are in harmony with the planet's boundaries.

iv. Healthy and Resilient Planet

Stresses the importance of protecting natural ecosystems and enhancing their resilience to climate change. This involves restoring damaged ecosystems and adapting to climate impacts to mitigate the negative effects of environmental degradation.

1.5 Job Drivers for Change

How the green transition will affect the job market.

i. Digital Transformation

As the green transition progresses, there will be a growing demand for digital and technological skills to support new green technologies and processes.

ii. New Organization of Work

Green jobs will increasingly require flexibility, as many tasks, especially in fields like environmental monitoring and ecosystem restoration, are dependent on specific environmental conditions.

iii. New Forms of Value Creation

Emphasizes the role of sustainability in new business models and production chains, highlighting how green jobs contribute to value creation by integrating environmental considerations into economic activities.

iv. Purpose-Driven Work

Many individuals, particularly younger workers, seek meaningful employment that aligns with their values, which includes contributing to sustainability and environmental stewardship.

These drivers indicate significant shifts in how energy is produced and consumed, how resources are managed, and how businesses and individuals behave, all of which will profoundly impact employment patterns and skill requirements in the future green economy.

2.Introduction to the I-STEM methodology with focus on Green skills for girls and online Green STEM Curricula Design Tool

Integrated Science, Technology, Engineering, and Math (I-STEM) methodology combines these disciplines into a cohesive learning approach, emphasizing collaborative, interdisciplinary problem-solving skills. This holistic educational model encourages students to apply their knowledge in practical settings, fostering innovation and critical thinking.

It is particularly effective in preparing students for careers in rapidly evolving fields, including those related to sustainability and environmental sciences.

2.1 Examples of I-STEM in Green Education

I-STEM education combines these disciplines into a cohesive learning model that focuses on interdisciplinary problem-solving and application-based learning. In green education, I-STEM encourages students to tackle environmental issues using a holistic approach that draws from all four STEM fields. Here are several examples of how I-STEM can be effectively implemented in green education:

i. Green Roof Project

Science: Students study the environmental benefits of green roofs, including insulation and biodiversity.

Technology: They use software to design the layout and irrigation systems of a green roof.

Engineering: Students engineer solutions to ensure the structural stability of a green roof on a school building.

Math: They calculate the necessary soil depth and materials needed, considering cost-effectiveness and sustainability.

ii. Water Quality Monitoring Using Robotics

Science: Pupils analyze factors affecting water quality in local water bodies.

Technology: Students use technology to monitor water quality through sensors integrated into robotic devices.

Engineering: They design and build water-sampling robots.

Math: Students apply statistical methods to analyze data collected from their robots to assess water quality over time.

iii. Energy Conservation Analysis

Science: Exploration of energy forms and the law of conservation of energy.

Technology: Use of energy monitoring tools to track energy consumption in the school.

Engineering: Designing and implementing modifications to existing school infrastructure to improve energy efficiency.

Math: Calculating potential energy savings and impact on the school’s carbon footprint.

iv. Bio-plastic Development from Organic Waste

Science: Studying the biochemical processes of biodegradation and polymerization.

Technology: Using technology to refine processes and enhance the properties of produced bio-plastics.

Engineering: Engineering the processing equipment and refining prototypes.

Math: Analyzing the efficiency and scalability of bio-plastic production through mathematical modeling.

These examples show how I-STEM education can provide students with the skills and knowledge to develop green solutions to real-world problems, making learning relevant and impactful while fostering a commitment to sustainability.

2.2 Application of I-STEM in Promoting Green Skills for Girls

Integrated Science, Technology, Engineering, and Math (I-STEM) methodologies are exceptionally powerful in promoting green skills among girls, providing them with the tools and confidence to engage in environmental sustainability. Here are examples of how I-STEM can foster green skills in young women:

i. Climate Change and Renewable Energy Module

Science: Girls learn about climate change, its impacts on ecosystems, and the science behind renewable energy sources like solar and wind.

Technology: They use software to simulate the effects of different renewable energy sources on reducing carbon footprints.

Engineering: Design and build models of solar panels or wind turbines to understand the mechanics and engineering challenges involved.

Math: Calculate the potential energy output and savings from their models, using data analysis skills.

Application: Such a module not only educates but also empowers girls to consider careers in renewable energy sectors, fostering a sense of capability in tackling major global challenges.

ii. Sustainable Urban Planning Workshop:

Science: Explore urban ecosystems and their interaction with human-made environments.

Technology: Use Geographic Information Systems (GIS) to map and plan sustainable city layouts that minimize environmental impact.

Engineering: Design efficient water management and green building solutions.

Math: Apply mathematical models to predict the outcomes of various urban planning decisions regarding sustainability.

Application: Engaging in practical city planning projects helps girls see the tangible impacts of their STEM skills, promoting interest in urban planning and architectural design focused on sustainability.

iii. Eco-friendly Product Design Sprint:

Science: Study the life cycles of various materials and their environmental impacts.

Technology: Utilize 3D modeling tools to design innovative, sustainable products.

Engineering: Prototype designs using recycled materials or biodegradable resources.

Math: Analyze the efficiency, cost, and potential market impact of their products.

Application: By creating and presenting viable eco-friendly products, girls can explore entrepreneurial opportunities and understand the business aspects of sustainable design.

By integrating these I-STEM projects into education, girls are not only prepared academically but are also inspired to become proactive leaders in green technology and sustainability, helping to close the gender gap in these vital fields.

2.3 online Green STEM Curricula Design Tools

Integrating Green STEM curricula in education is crucial for fostering environmental awareness and skills among students worldwide. Here are examples of online Green STEM curricula design tools both in Europe and globally that support educators in this endeavor:

i. GLOBE Program (Global) https://www.globe.gov/

The Global Learning and Observations to Benefit the Environment (GLOBE) program is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process. Its comprehensive online resources support curricula design around atmospheric observations, earth sciences, and biological data, focusing on environmental sustainability.

ii. SEEd - Sustainability and Environmental Education (UK) https://se-ed.org.uk/

SEEd provides resources and support for educators in the UK to help integrate sustainability into school curricula. It offers training, tools, and guidance to develop a whole-school approach to sustainability, which can be adapted to various educational settings.

iii. GreenLearning Canada (Global) https://greenlearning.ca/

GreenLearning Canada offers online tools that create interactive and engaging educational experiences focused on energy, climate change, and green economy topics. Their programs include e-courses, webinars, and a rich repository of lesson plans that facilitate the integration of green skills into STEM education.

iv. Eco-Schools (Europe and Global) https://eco2-schools.eu/

This international program operated by the Foundation for Environmental Education (FEE) encourages schools to engage in sustainable development education. Eco-Schools provides a framework for environmental management and certification, along with access to a wealth of resources for curriculum development that includes action plans and learning activities aligned with sustainable practices.

v. Curious Minds Discover STEM (Ireland) https://www.sfi.ie/engagement/curious-minds/

Part of Science Foundation Ireland's Education and Public Engagement Programme, this platform offers teacher training and resources to encourage primary school teachers in Ireland to integrate STEM with a focus on inquiry-based learning and environmental awareness.

Each of these platforms equips educators with the tools necessary to create dynamic learning environments that encourage students to explore and address environmental issues through STEM education. These resources are essential for developing the next generation's ability to tackle global challenges related to sustainability.

3. The Co-Creation Challenge Based Learning (CCC_BL) approach in the context of Environmental Sustainability

3.1 The Co-Creation Challenge Based Learning (CCC_BL) approach

What

Through Challenge Based Learning co creation approach students collaboratively design a challenge to be addressed by their peers team enhancing students to:

-actively engaged

-co design and co create didactics pathways

-having the sense of ownership of their learning process

-focus on a specific challenge/topic of Environmental Sustainability

-provide solution

Teachers Role

-introduce Environmental Sustainability aspects, challenges/topics

-form groups of 4-5 students

-apply the circular model

-set the task to every team “Design a learning scenario to be addressed by another team”

-provide a series of relevant resources

-act as facilitator setting inquiry questions during the sessions such as: “go through the resources”, “why do you refer to it”, “what makes you say that”

When

Relevant for students 15 to 17 years

Challenge-based learning using a co-creation (CCC_BL) approach is particularly relevant for students aged 15 to 17 for several key reasons providing a dynamic and interactive educational environment that benefits them by preparing for further education, the workforce and civic life, cultivating a proactive, engaged and capable generation.

i. Enhances engagement since this age group is often characterized by a search for relevance and a desire to engage with real-world issues. CCC_BL presents complex, authentic problems that matter in the real world, which can significantly boost student engagement and motivation. When students are involved in co-creating the learning process, they feel a sense of ownership and responsibility towards the outcome, which further enhances their engagement.

ii. Develops Critical Thinking and Problem-Solving Skills. CCC_BL challenges students to use critical thinking to explore and solve complex problems. Through co-creation, students contribute their ideas and perspectives, which requires them to evaluate information critically, make decisions, and think creatively. These are essential skills for academic success and future careers, particularly in a rapidly changing world.

iii. Fosters Collaboration and Communication through Co-creation involving students working in teams to solve challenges, which naturally develops their collaboration and communication skills. As they negotiate, share ideas, and combine their strengths, students learn valuable interpersonal skills that are crucial in both personal and professional contexts.

iv. Encourages Practical Application of Knowledge connecting academic theories to real-world applications, making learning more practical and tangible. Students aged 15 to 17 are at a critical juncture where they begin considering future career paths and educational opportunities. Seeing how academic concepts apply in real-world scenarios can help them make informed decisions about their futures.

v. Promotes Digital Literacy and Technological Proficiency, since many challenge-based projects require the use of technology and digital tools. In a co-creation setting, students often utilize these tools to research, collaborate, and present their findings, which enhances their digital literacy and prepares them for a technologically advanced world.

vi. Supports Personalized Learning by allowing students to explore areas of personal interest within the framework of the challenge. In a co-creation model, educators can tailor challenges to align with the interests and needs of the students, which leads to a more personalized learning experience that adapts to the unique educational journey of each student.

vii. Builds Resilience and Adaptability by tackling real-world challenges and often facing setbacks or needing to rethink their strategies, students develop resilience. The co-creation aspect ensures that they are not passively receiving content but are actively engaged in molding their learning pathways, adapting to new information, and overcoming obstacles.

3.2 Environmental Sustainability and Education

Environmental sustainability is a critical focus in education, and several European initiatives and organizations provide resources and support to integrate sustainability into educational curricula. Here are four relevant European sites that are actively involved in promoting environmental sustainability through education:

i. Education for Climate (European Commission): https://education-for-climate.ec.europa.eu/community/

This initiative by the European Commission aims to support and enhance the role of education in achieving climate neutrality by 2050. The platform offers a wide range of resources, policies, and best practices for integrating climate education and environmental sustainability into schools and educational systems across the EU.

ii. SEEd - Sustainability and Environmental Education (UK): https://se-ed.org.uk/

SEEd is a UK-based charity that supports educators, schools, and communities in developing and embedding sustainability and environmental education. The organization provides resources, training, and guidance to help educators integrate sustainability themes across the curriculum.

iii. Foundation for Environmental Education (FEE) (Denmark): https://www.fee.global/

FEE is a global organization based in Denmark that promotes sustainable development through environmental education. It is known for programs like Eco-Schools, Young Reporters for the Environment, and Learning about Forests, which provide frameworks and resources for schools worldwide, including Europe, to engage in sustainability education.

iv. Eco-Schools (Europe and Global): https://www.ecoschools.global/

Eco-Schools is one of the largest global sustainable schools programs, which encourages young people to engage with their environment by allowing them the opportunity to actively protect it. It provides a framework to help embed ecological principles into the heart of school life, affecting long-term behavior of students, staff, families, and local authorities.

These sites represent a robust effort to enhance environmental sustainability in European educational systems, providing essential tools, programs, and resources that foster a deeper understanding and commitment to environmental issues among students and educators alike.

3.3 Environmental Sustainability Challenges/Topics

Environmental sustainability encompasses a broad range of topics, each crucial for addressing the various aspects of humanity's impact on the planet. Here are several key topics along with reputable websites where you can find reliable information, educational resources and the latest research:

i.Climate Change: Understanding the causes, impacts, and solutions to climate change is essential for sustainability education.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en

The EEA provides comprehensive reports and data on the state of the environment in Europe, including climate change impacts and adaptation strategies.

ii. Biodiversity: The study of ecosystems, species diversity, and the impacts of human activity on natural habitats.

Website: EUROPARC Federation https://www.europarc.org/

EUROPARC is a network of protected areas in Europe that works to improve the management of natural areas for biodiversity conservation.

iii. Renewable Energy and Energy Efficiency: Promoting the use of renewable energy sources and improving energy efficiency across sectors.

Website: European Renewable Energy Council (EREC) https://www.erec.org/

EREC is an umbrella organization of European renewable energy industry, trade, and research associations, providing policy guidance and updates on renewable energy developments.

iv. Sustainable Transport: Developing transportation strategies that reduce environmental impact, including promoting public transport and non-motorized mobility.

Website: Transport & Environment (T&E) https://www.transportenvironment.org/

T&E is a leading Brussels-based organization promoting, at the EU and global level, policy that ensures cleaner, safer, smarter transport.

v. Resource Efficiency and Waste Management: Enhancing efficiency in the use of resources while reducing waste production and improving recycling and upcycling practices.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en/topics/at-a-glance/economy-and-resources

The EEA also provides extensive resources on waste generation and management practices across Europe, aiming to support sustainable waste policies.

vi. Water Conservation and Management: Addressing water scarcity and quality issues through sustainable water management practices.

Website: European Water Association (EWA) https://www.ewa-online.eu/

EWA is dedicated to the management of water resources in Europe, promoting sustainable water management practices through research and policy advocacy.

4.The Qualifications Based Career Guidance (Q_BCG) on Circular Economy

4.1 The Qualifications Based Career Guidance (Q_BCG) approach

What

Qualifications are a set of Values, Attitudes, Skills and Knowledge (VASK) prerequisite in the Job Market. This is attested by studies, diplomas, certifications, awards, recommendation letters, testimonials etc. according to job specifications.

In the Qualifications Based Career Guidance (Q_BCG) approach, teachers play a pivotal role as facilitators and resource providers. They organize and guide the initial assessment of the school's environment and student needs, select appropriate job-related resources, and assist students in researching and understanding job market requirements. Teachers also support students in preparing and delivering presentations, fostering a comprehensive understanding of career pathways.

When

It is suggested for 15 to 17 yrs students

The Qualifications Based Career Guidance (Q_BCG) approach is particularly relevant for students aged 15 to 17 as it aligns closely with the critical stage where they begin to make pivotal decisions about their future educational and career paths. This approach helps students understand the real-world requirements of various professions, including necessary qualifications such as Values, Attitudes, Skills, and Knowledge (VASK), which are crucial for success in the job market. The Q_BCG approach is highly beneficial for students aged 15 to 17 for several reasons:

i. Career Awareness by assisting students gain early awareness of various career options and the qualifications required for those roles. This knowledge can steer their academic and extracurricular choices towards fields they are genuinely interested in and are required by potential careers.

ii. Informed Decision-Making by understanding the qualifications needed for specific jobs, students can make more informed decisions about their education and career paths. This includes choosing relevant subjects, courses, and training programs that align with their career goals.

iii. Motivation and Goal Setting by understanding what qualifications are needed for desired jobs can motivate students to set realistic academic and career goals. This clarity can increase their motivation to excel in specific areas of study or develop skills crucial for their chosen career paths.

iv. Enhances Employability through early exposure to the qualifications required in the job market helps students to focus on acquiring these credentials and skills, thus enhancing their employability and readiness for the workforce.

v. Personal Development by encouraging personal development and promoting values and attitudes alongside skills and knowledge. This holistic development is crucial as employers increasingly look for well-rounded candidates who not only possess technical skills but also exhibit strong interpersonal and ethical qualities.

4.2 Circular Economy (CE) and Education

Integrating the circular economy into education, particularly focusing on initiatives that promote inclusivity such as programs for girls, is essential in building a sustainable future. Here are five European sites that offer valuable resources and programs dedicated to circular economy education, including initiatives specifically aimed at empowering girls:

i. Girls Go Circular https://eit-girlsgocircular.eu/

Description: Girls Go Circular is an initiative that aims to empower young women in Europe with digital and entrepreneurial skills to innovate in the circular economy. The program offers free online courses that combine elements of STEM education with circular economy concepts, specifically designed to encourage girls to pursue careers in these vital fields.

ii. Ellen MacArthur Foundation https://www.ellenmacarthurfoundation.org/

Description: A leading global authority on circular economy, the Ellen MacArthur Foundation provides educational resources, courses, and case studies to help integrate circular economy principles into education. The foundation's learning hub is an excellent resource for educators and students seeking to apply sustainability principles practically.

iii. EIT RawMaterials Academy https://eitrawmaterials.eu/academy/

Description: Supported by the European Institute of Innovation and Technology, this academy focuses on education and training programs about raw materials and circular economy principles. It provides numerous learning opportunities through educational projects, master's programs, and professional courses.

iv. Circle Economy https://www.circle-economy.com/

Description: Based in the Netherlands, Circle Economy drives the transition to a circular economy through practical and scalable solutions. It also delivers research, tools, and reports that can be utilized by educators and policymakers to understand and implement circular economy strategies in various sectors.

These sites represent a mix of educational resources, training programs, and initiatives aimed at fostering an understanding and implementation of the circular economy, with a particular emphasis on empowering the next generation, including specific opportunities for girls.

4.3 CE Aspects/Topics for Q_BCG titles

The Qualifications Based Career Guidance (Q_BCG) approach for the circular economy in Europe can focus on specific job roles and skills needed in this growing field. Here are six proposed titles for topics within this guidance framework, along with recommended European websites that provide comprehensive information on each topic:

i. Circular Economy Project Manager

Title: "Skills and Qualifications for Circular Economy Project Managers"

Website: Circular Economy Club https://www.circulareconomyclub.com/

The Circular Economy Club is a global network of circular economy professionals and organizations. It offers insights into the roles and skills needed to manage circular economy projects effectively, including strategy development and implementation.

ii. Sustainable Product Designer

Title: "Navigating a Career in Sustainable Product Design"

Website: EcoDesign Circle https://www.ecodesigncircle.eu/

EcoDesign Circle focuses on sustainable design practices that are essential for creating products in line with circular economy principles. It provides resources and case studies on eco-design and the qualifications necessary for a career in this area.

iii. Circular Economy Research Analyst

Title: "Becoming a Circular Economy Research Analyst: Essential Skills and Pathways"

Website: Ellen MacArthur Foundation https://www.ellenmacarthurfoundation.org/

As a leader in circular economy thought, the Ellen MacArthur Foundation offers extensive resources on the analytical skills and knowledge needed to research and promote circular economy practices.

iv. Circular Supply Chain Coordinator

Title: "Career Guide: Circular Supply Chain Coordination"

Website: Supply Chain Movement https://www.supplychainmovement.com/

This site provides insights into the complexities of supply chain management within the circular economy, highlighting the skills required to coordinate supply chains that minimize waste and maximize resource use.

v. Waste Management Consultant

Title: "Qualifications for a Career in Waste Management Consulting"

Website: Zero Waste Europe https://zerowasteeurope.eu/

Zero Waste Europe offers detailed guidance on pursuing a career in waste management and consulting, focusing on strategies to achieve zero waste and the necessary qualifications.

vi.Renewable Energy Systems Engineer

Title: "Engineering Careers in Renewable Energy Systems"

Website: European Renewable Energy Council (EREC) https://www.erec.org/

EREC provides resources related to careers in renewable energy, essential for the transition to a circular economy. It covers the skills and educational pathways necessary for engineers in this sector.

5. Elaboration on the most needed Green and Circular skills for nowadays and future labor market

i. Digital and Technological Proficiency

As green jobs integrate digital technologies, skills in data analysis, software use, and understanding of digital platforms are essential. Workers must be adept with technologies that improve energy efficiency or environmental monitoring, and those that enable remote and flexible working arrangements.

i.1. Data Analysis:

Proficiency in Statistical Software: Ability to use software like R, Python, or SAS for statistical analysis to model environmental data and forecast trends.

Data Visualization Skills: Expertise in creating intuitive visualizations using tools such as Tableau or Power BI to communicate findings effectively to stakeholders.

Quantitative Reasoning: Strong quantitative skills to understand and analyze data related to emissions, resource consumption, and sustainability performance metrics.

Predictive Analytics: Capability to apply machine learning algorithms for predictive assessments and scenario planning, enhancing decision-making processes in resource management and environmental conservation.

i.2. Software Use:

GIS Proficiency: Skilled in Geographic Information Systems (GIS) for mapping and spatial analysis crucial for tasks like land use planning, habitat conservation, and environmental impact assessments.

CAD Software Skills: Knowledge of Computer-Aided Design (CAD) software for designing sustainable infrastructure or modifications to existing facilities to improve their environmental footprint.

Simulation Software Expertise: Ability to use simulation tools to model environmental scenarios, such as climate modeling or assessing the impact of renewable energy sources.

IoT Integration: Skills in integrating and managing IoT devices that monitor environmental conditions, such as air and water quality sensors, to facilitate real-time data collection and response.

i.3. Understanding of Digital Platforms:

Collaboration Tools Proficiency: Expertise in using digital collaboration platforms like Slack, Microsoft Teams, or Asana to facilitate remote teamwork and project management.

Cloud Computing Knowledge: Understanding of cloud services like AWS, Google Cloud, or Microsoft Azure, which are pivotal for storing and processing large environmental data sets securely and efficiently.

Digital Literacy in Remote Technologies: Familiarity with remote monitoring technologies and software, crucial for overseeing distributed energy resources or remote conservation areas.

Cybersecurity Basics: Awareness of cybersecurity principles to protect sensitive environmental data, which is increasingly targeted in cyber-attacks.

These specifications are crucial as they empower professionals to effectively address and solve environmental challenges through advanced technological means. Data analysis skills ensure that decisions are informed by accurate and timely information, software use skills enable the practical implementation of environmental plans, and an understanding of digital platforms enhances communication and operational efficiency across global teams. Together, these skills facilitate a holistic approach to sustainability, driving innovation and effectiveness in green initiatives and projects, thus making a substantial contribution to global environmental goals.

ii. Sustainability Competence

A deep understanding of sustainability, including the ability to assess and implement practices that support ecological balance, is paramount. This involves knowledge of renewable energy systems, waste reduction, and sustainable resource management. Here's a detailed specification for each critical area within sustainability competence:

ii.1. Knowledge of Renewable Energy Systems:

System Design and Integration: Proficiency in designing and integrating renewable energy systems, such as solar, wind, and hydro, into existing energy infrastructures to enhance sustainability.

Performance Monitoring: Skills in monitoring and optimizing the performance of renewable energy installations to ensure they operate at peak efficiency, utilizing technologies like smart grids and energy management software.

Regulatory Compliance: Understanding of local, national, and international regulations affecting renewable energy implementation, including subsidies, tariffs, and environmental impact assessments.

ii.2. Waste Reduction Techniques:

Waste Audit Expertise: Ability to conduct comprehensive waste audits to identify major sources of waste and opportunities for reduction, including the use of waste tracking and analytics tools.

Recycling and Upcycling Methods: Knowledge of advanced recycling techniques and upcycling practices that transform waste materials into new products, reducing overall waste and resource consumption.

Circular Economy Implementation: Understanding of circular economy principles to design systems and processes that minimize waste, such as product life extension, material recovery, and waste-to-energy technologies.

ii.3. Sustainable Resource Management:

Resource Efficiency Strategies: Skill in developing and implementing strategies to use resources more efficiently, such as water-saving technologies and energy-efficient building designs.

Sustainability Auditing: Capability to perform sustainability audits that assess the environmental impact of organizational operations and suggest improvements aligned with sustainable practices.

Supply Chain Sustainability: Expertise in creating sustainable supply chains by integrating eco-friendly materials, ensuring ethical sourcing, and promoting sustainability certifications among suppliers.

ii.4.Cross-Cutting Skills:

Sustainability Reporting: Ability to generate sustainability reports using frameworks like GRI (Global Reporting Initiative) and SASB (Sustainability Accounting Standards Board), which detail organizational impacts on the environment, society, and economic sustainability.

Stakeholder Engagement: Skills in engaging various stakeholders, from employees to investors, in sustainability initiatives, using tools such as workshops, seminars, and collaborative platforms.

Innovative Problem-Solving: Capacity to apply creative thinking to solve environmental challenges, including developing new business models that align profitability with sustainability.

Project Management in Sustainability Projects: Proficiency in managing projects focused on sustainability, ensuring they meet their goals, stay within budget, and achieve desired impacts.

Professionals equipped with these specific skills in sustainability competence are better prepared to lead and innovate in their fields, driving the transition towards more sustainable practices and technologies in industries worldwide. These competencies are not only essential for achieving ecological balance but also for ensuring economic viability and social equity in the long term.

iii. Innovative Thinking and Adaptability

Innovative Thinking and Adaptability are key competencies in the green job sector, enabling professionals to develop and implement solutions that reduce environmental impact while adapting to technological and market changes. Here's an in-depth look at the specifications for these skills:

iii.1. Innovative Thinking:

Creativity in Problem Solving: Ability to think outside the box to find unique solutions to environmental challenges. This involves using creative thought processes to rethink how resources are used and how processes are conducted, leading to more sustainable outcomes.

Interdisciplinary Knowledge Application: Integrating knowledge from various disciplines (e.g., biology, chemistry, engineering, and business) to innovate solutions that are both technically feasible and environmentally beneficial.

Prototype and Pilot Testing: Skills in designing, testing, and refining prototypes of sustainable technologies or processes. This iterative process is essential for turning innovative ideas into practical solutions that can be implemented on a larger scale.

iii.2. Adaptability:

Flexibility in Methodologies: Capability to change and adapt methodologies based on new scientific findings, technological advancements, or changes in regulatory landscapes. This includes the ability to pivot project goals and strategies as needed.

Lifelong Learning: Commitment to continuous education and professional development to stay updated with the latest in technology, sustainability practices, and industry standards. This involves participating in workshops, courses, and certifications relevant to one's field.

Technology Adaptation: Quick adaptation to new technologies that promote sustainability, such as renewable energy tech, advanced recycling systems, or environmental monitoring tools.

iii.3. Systems Thinking:

Holistic Approach: Understanding and applying systems thinking to ensure that solutions consider all facets of the system, including economic, environmental, and social dimensions. This helps in designing interventions that do not solve one problem while creating another.

Feedback Loops and Dynamics: Skills in identifying and managing feedback loops in environmental systems, which are crucial for predicting long-term impacts of sustainability initiatives.

iv.4. Resilience and Risk Management:

Anticipating Change: Ability to foresee and plan for environmental, economic, and technological changes, thus minimizing risks associated with sustainability projects.

Crisis Management: Proficiency in managing unexpected situations and crises, adapting strategies quickly to mitigate negative impacts on the environment and business operations.

v.5. Collaborative Innovation:

Team Collaboration: Skills in working collaboratively across various departments and disciplines to foster innovation. This includes the ability to communicate complex ideas clearly and persuasively to gain support for innovative projects.

Stakeholder Engagement: Engaging with stakeholders including community members, governmental bodies, and other organizations to co-create sustainable solutions and gain diverse insights, which can lead to more innovative outcomes.

iv. Project Management and Leadership

Project Management and Leadership skills are increasingly vital in the realm of green jobs, especially in projects that focus on ecosystem restoration and sustainable infrastructure. These skills ensure that projects are executed efficiently, meet their sustainability objectives, and effectively manage the human resources involved. Here's an in-depth specification for each critical area within project management and leadership:

iv.1. Strategic Planning and Execution:

Goal Setting: Ability to define clear, measurable and achievable sustainability goals for projects, aligning with broader environmental and organizational objectives.

Resource Allocation: Proficiency in effectively allocating resources, including time, budget, and manpower, to maximize efficiency and impact of sustainability projects.

Risk Management: Skills in identifying potential risks and developing mitigation strategies to ensure smooth project execution and to prevent or minimize disruptions.

iv.2. Leadership in Diverse Teams:

Inclusive Leadership: Capability to lead diverse teams, respecting and leveraging different perspectives, backgrounds, and skill sets, which is crucial in global and culturally diverse environments.

Conflict Resolution: Skills in identifying and resolving conflicts within teams, ensuring that team dynamics support rather than hinder project goals.

Motivation and Team Building: Ability to inspire and motivate team members, fostering a collaborative and enthusiastic work environment that drives project success.

iv.3. Effective Communication:

Stakeholder Communication: Proficiency in communicating with a range of stakeholders, from team members and executives to external partners and the public, ensuring all are informed and engaged.

Reporting and Documentation: Skills in creating detailed reports and maintaining accurate records that document project progress and outcomes, essential for transparency and accountability.

Presentation Skills: Ability to present project goals, progress, and outcomes effectively to various audiences, securing support and resources necessary for project success.

iv.4. Adaptability and Crisis Management:

Agility: Ability to adapt plans and strategies in response to changing circumstances, such as shifts in regulatory requirements, environmental conditions, or stakeholder needs.

Crisis Handling: Skills in managing unexpected challenges and crises, quickly devising and implementing effective solutions to keep the project on track.

iv.5. Technical Knowledge in Sustainability:

Ecological and Environmental Knowledge: Deep understanding of ecological principles and environmental issues relevant to the project, crucial for making informed decisions that truly benefit the environment.

Sustainable Practices Implementation: Expertise in applying sustainable practices specifically tailored to the project's needs, whether in construction, conservation, or resource management.

iv.6. Decision Making:

Analytical Thinking: Ability to analyze complex data and situations to make informed decisions that align with long-term sustainability goals.

Strategic Decision-Making: Skills in making strategic decisions that consider both immediate and long-term impacts on the project and the environment.

v. Regulatory Knowledge

Regulatory Knowledge is essential for professionals involved in sustainability to ensure that their projects comply with environmental laws and standards at various levels. Here's a detailed specification for the necessary skills under this competency:

v.1. Knowledge of Environmental Laws:

Local Regulations: Understanding of local environmental regulations, including municipal and state/province laws that govern land use, pollution control, waste management, and resource conservation. This ensures projects are developed in accordance with local legal frameworks, preventing legal disputes and fostering community support.

National Legislation: Proficiency in national laws and policies that impact environmental practices, such as the Clean Air and Water Acts in the United States, or the Environmental Protection Act in the UK. This knowledge is crucial for projects that span multiple regions or that have significant environmental impacts.

International Standards: Familiarity with international environmental agreements and standards, such as the Paris Agreement on climate change, the Convention on Biological Diversity, or ISO sustainability standards. This is especially important for multinational companies and projects that operate across borders.

v.2. Compliance and Auditing Skills:

Compliance Strategies: Ability to develop and implement strategies that ensure project compliance with environmental regulations. This includes setting up internal audits and regular reviews to assess compliance.

Auditing Techniques: Skills in conducting environmental audits to evaluate the conformity of project practices with legal and regulatory requirements. This helps identify potential non-compliance issues before they become problematic.

Reporting and Documentation: Expertise in documenting compliance efforts and outcomes, which is vital for legal and regulatory purposes. Proper documentation supports compliance during inspections and can protect against legal challenges.

v.3. Policy Interpretation and Application:

Legal Interpretation: Ability to interpret complex legal texts and understand their implications for project planning and implementation. This skill is crucial for translating legal requirements into actionable project specifications.

Policy Analysis: Skills in analyzing policy changes and predicting how future regulations might impact ongoing and planned projects. This foresight can be crucial for long-term project planning and sustainability.

v.4. Stakeholder Liaison:

Government Relations: Proficiency in liaising with government agencies and regulatory bodies to ensure project compliance and to advocate for favorable regulatory conditions. This involves negotiating with regulators to secure permits and licenses.

Public Communication: Ability to communicate regulatory issues effectively to the public and other stakeholders, helping to maintain transparency and build trust.

v.5. Risk Management:

Risk Assessment: Skills in identifying regulatory risks associated with environmental projects and implementing measures to mitigate these risks.

Legal Compliance Risk Management: Ability to develop risk management strategies that specifically address compliance with environmental regulations, minimizing potential legal and financial penalties.

vi .Interdisciplinary Skills

Interdisciplinary Skills are crucial in green jobs due to the interconnected nature of environmental issues, which span scientific, technical, economic, and managerial fields. These skills enable professionals to approach sustainability challenges holistically and develop comprehensive solutions. Here's a breakdown of the key interdisciplinary skills needed in the green job sector:

vi.1. Engineering and Technical Skills:

System Design and Analysis: Ability to design and analyze complex systems, such as energy systems, water treatment facilities, or sustainable infrastructure, considering both efficiency and environmental impact.

Technical Problem Solving: Skills in applying engineering principles to solve environmental problems, such as developing pollution control technologies or renewable energy solutions.

vi.2. Environmental Science Knowledge:

Ecosystem Understanding: Deep knowledge of ecological systems and the potential impacts of human activities on these systems. This includes understanding biodiversity, conservation practices, and restoration ecology.

Environmental Assessment: Proficiency in conducting environmental impact assessments (EIA) and sustainability assessments to evaluate the effects of projects on the environment and mitigate adverse impacts.

vi.3. Business Management:

Sustainable Business Practices: Skills in integrating sustainability into business operations, from resource management to corporate social responsibility initiatives.

Project Management: Ability to lead and manage projects, ensuring they are completed on time, within budget, and meet sustainability criteria. This includes stakeholder management, budgeting, and resource allocation.

vi.4. Economics and Policy:

Environmental Economics: Understanding of economic concepts related to the environment, such as externalities, sustainability metrics, and cost-benefit analysis of environmental policies.

Policy Development and Implementation: Skills in developing, advocating for, and implementing policies that promote sustainability. This includes understanding regulatory frameworks and engaging in policy analysis and lobbying.

vi.5. Communication and Collaboration:

Multidisciplinary Communication: Ability to communicate effectively across disciplines, explaining complex environmental and technical concepts to stakeholders with different backgrounds.

Team Collaboration: Skills in working collaboratively in diverse teams that may include scientists, engineers, business leaders, and policymakers, leveraging each member's expertise.

vi.6. Analytical and Research Abilities:

Data Analysis: Competency in analyzing data from various sources to inform decision-making and policy. This includes statistical analysis and the use of scientific methods and software.

Research Skills: Ability to conduct interdisciplinary research, integrating methods and insights from various fields to address environmental challenges.

vi.7. Adaptability and Learning:

Continuous Learning: Commitment to lifelong learning to stay abreast of emerging technologies, scientific advancements, and regulatory changes in the field of sustainability.

Adaptability: Capability to adapt to new information and changing environmental conditions, applying an interdisciplinary approach to develop effective solutions.

vii. Ethical and Responsible Work Practices

Ethical and Responsible Work Practices are essential in green jobs, ensuring that environmental initiatives not only protect the planet but also promote social equity and adhere to high ethical standards. Here's a detailed specification of the skills involved in ethical and responsible work practices:

vii.1. Ethical Decision-Making:

Ethical Frameworks: Understanding and applying ethical frameworks to make decisions that reflect the values of integrity, honesty, and fairness. This includes considering the long-term impacts of decisions on the environment, communities, and the economy.

Transparency: Commitment to transparency in operations, ensuring that all stakeholders are informed about the processes, decisions, and outcomes related to environmental projects.

vii.2. Social Equity:

Inclusivity in Policy and Planning: Skills in developing policies and plans that address the needs of diverse populations, ensuring that environmental benefits and burdens are shared equitably across all segments of society.

Community Engagement: Ability to engage with local communities effectively, involving them in decision-making processes to ensure that projects are culturally appropriate and beneficial to all community members.

vii.3. Fair Labor Practices:

Labor Rights Protection: Knowledge of labor laws and standards, and the ability to implement workplace practices that protect workers' rights and welfare, including safe working conditions, fair wages, and reasonable working hours.

Workforce Development: Commitment to the professional development of employees, providing training and career advancement opportunities that enhance their skills and job satisfaction.

vii.4. Diversity and Inclusion:

Cultural Competence: Skills in managing culturally diverse teams, understanding and respecting different perspectives, which can lead to more innovative and comprehensive solutions.

Diversity Advocacy: Advocating for and implementing hiring practices that promote diversity in the workplace, ensuring representation from varied demographics, backgrounds, and viewpoints.

vii.5. Sustainable Business Practices:

Sustainability Integration: Ability to integrate sustainability into all business practices, ensuring that operations do not harm the environment and contribute to the conservation of resources for future generations.

Environmental Compliance: Ensuring that all business practices comply with environmental regulations and exceed minimum standards where possible to promote better environmental outcomes.

vii.6. Stakeholder Relations:

Stakeholder Analysis: Skills in identifying key stakeholders and understanding their interests and impacts in relation to environmental projects.

Stakeholder Communication: Effective communication strategies to keep stakeholders engaged and informed, building trust and support for sustainability initiatives.

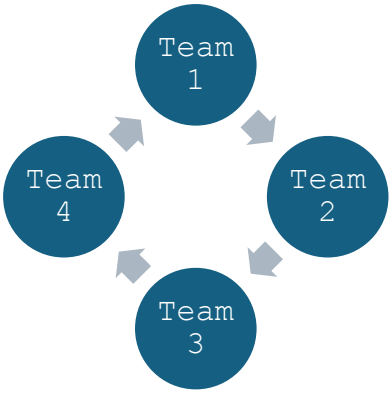
vii.7. Corporate Social Responsibility (CSR):

CSR Strategy Development: Developing strategies that align business operations with broader social and environmental goals, such as reducing carbon footprints, supporting community projects, or engaging in philanthropy.

Impact Measurement: Ability to measure the social and environmental impact of CSR initiatives, ensuring that they deliver real benefits and adjust strategies based on outcomes.

6. Indicative learning scenarios (formal and informal learning) supporting teachers in designing their I-STEM in the context of Environmental Sustainability and Circular Economy lesson plans

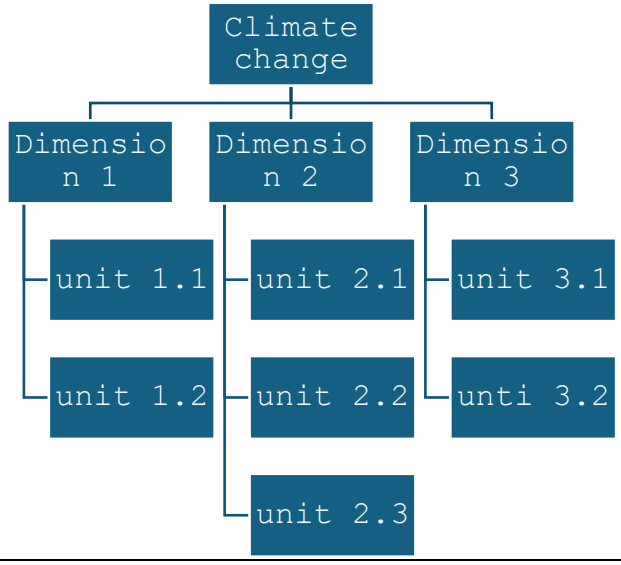
6.1 Learning Scenario on Environmental Sustainability through Co-Creation Challenge Based Learning (CCC_BL) approach

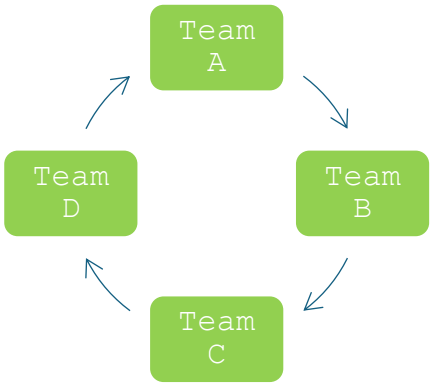
Title	Addressing Environmental Sustainability through Co Creation Challenge based approach	
Author		
Language:	En	
Institution:	Platon	
Platform information:	Link:	
	Login:	
	Password:	
Target group:	Age:	15-17
	Grade:	K9-K11
	Type of School:	General Education
Aims:	Students to: -actively engaged -co design and co create didactics pathways -having the sense of ownership of their learning process -focus on a specific challenge/topic of Environmental Sustainability -provide solution	
Keywords *Use # in front*	#green skills #environmental sustainability #challenge based learning #co creation #solutions #students #collaborative	
Background knowledge:	"Learners with the willingness to acquire the skills and knowledge required for the green transition need to have easier access to qualified instructors and revamped curricula" Asikainen, T., Bitat, A., Bol, E., Czako, V., Marmier, A., Muench, S., Murauskaite-Bull, I., Scapolo, F.,Stoermer, E. The future of jobs is green, EUR 30867 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42571-7, doi:10.2760/218792, JRC126047	
Strategy/Technic	Challenge Based Learning co creation approach (CBLcc)	
	Short description: Through Challenge Based Learning co creation approach students collaboratively design a challenge to be addressed by their peers team	
Time *Use hours*	12	
Bibliography:	https://education-for-climate.ec.europa.eu/community/ https://www.eea.europa.eu/en	
Notes for the teacher:	-the Teacher introduce Environmental Sustainability aspects -form groups of 4-5 students -set the task to every team "Design a learning scenario to be addressed by another team" -apply the circular model  -provide a series of relevant resources -act as facilitator setting inquiry questions during the sessions such as: "go through the resources", "why do you refer to it", "what makes you say that"	

Activities performed by students: *Use steps to describe all activities, put them in the order they appear in the guidance and estimated time (e.g. 20')*	Session 1,2 (90' min.) Step 1: What is Environmental Sustainability – introduction from teacher Environmental sustainability is a critical focus in education, and several European initiatives and organizations provide resources and support to integrate sustainability into educational curricula. Here are four relevant European sites that are actively involved in promoting environmental sustainability through education: i.Education for Climate (European Commission): https://education-for-climate.ec.europa.eu/community/ This initiative by the European Commission aims to support and enhance the role of education in achieving climate neutrality by 2050. The platform offers a wide range of resources, policies, and best practices for integrating climate education and environmental sustainability into schools and educational systems across the EU. ii. SEEd - Sustainability and Environmental Education (UK): https://se-ed.org.uk/ SEEd is a UK-based charity that supports educators, schools, and communities in developing and embedding sustainability and environmental education. The organization provides resources, training, and guidance to help educators integrate sustainability themes across the curriculum. iii. Foundation for Environmental Education (FEE) (Denmark): https://www.fee.global/ FEE is a global organization based in Denmark that promotes sustainable development through environmental education. It is known for programs like Eco-Schools, Young Reporters for the Environment, and Learning about Forests, which provide frameworks and resources for schools worldwide, including Europe, to engage in sustainability education. iv. Eco-Schools (Europe and Global): https://www.ecoschools.global/ Eco-Schools is one of the largest global sustainable schools programs, which encourages young people to engage with their environment by allowing them the opportunity to actively protect it. It provides a framework to help embed ecological principles into the heart of school life, affecting long-term behavior of students, staff, families, and local authorities. Step 2: Teams of 4-5 students formulation Optional – roles definitions: Designer, Researcher(s), Writer, Presenter Step 3: Challenge/topic selection from every team Environmental sustainability encompasses a broad range of challenges/topics, each crucial for addressing the various aspects of humanity's impact on the planet. Here are several key challenges/topics along with reputable websites where you can find reliable information, educational resources, and the latest research: i. Climate Change: Understanding the causes, impacts, and solutions to climate change is essential for sustainability education. Website: European Environment Agency (EEA) https://www.eea.europa.eu/en The EEA provides comprehensive reports and data on the state of the environment in Europe, including climate change impacts and adaptation strategies. ii. Biodiversity: The study of ecosystems, species diversity, and the impacts of human activity on natural habitats. Website: EUROPARC Federation https://www.europarc.org/ EUROPARC is a network of protected areas in Europe that works to improve the management of natural areas for biodiversity conservation.

iii. Renewable Energy and Energy Efficiency: Promoting the use of renewable energy sources and improving energy efficiency across sectors.
Website: European Renewable Energy Council (EREC) https://www.erec.org/
EREC is an umbrella organization of European renewable energy industry, trade, and research associations, providing policy guidance and updates on renewable energy developments.
iv. Sustainable Transport: Developing transportation strategies that reduce environmental impact, including promoting public transport and non-motorized mobility.
Website: Transport & Environment (T&E) https://www.transportenvironment.org/
T&E is a leading Brussels-based organization promoting, at the EU and global level, policy that ensures cleaner, safer, smarter transport.
v. Resource Efficiency and Waste Management: Enhancing efficiency in the use of resources while reducing waste production and improving recycling and upcycling practices.
Website: European Environment Agency (EEA)
https://www.eea.europa.eu/en/topics/at-a-glance/economy-and-resources
The EEA also provides extensive resources on waste generation and management practices across Europe, aiming to support sustainable waste policies.
vi. Water Conservation and Management: Addressing water scarcity and quality issues through sustainable water management practices.
Website: European Water Association (EWA) https://www.ewa-online.eu/
EWA is dedicated to the management of water resources in Europe, promoting sustainable water management practices through research and policy advocacy.

Session 3-6 (180')
Step 4: Design and development of the challenge
Every team will create a learning scenario to drive next team completing the template

Title	
Big picture	
Articulation	*It can be done by a video, skets, article, movie etc* *Able to attract the interest of their peers*
Resources	*Data, articles, journals, websites, blogs etc*
Mode	*ppts, video, collage , skets, comic, game etc.*
Writers	

	Sessions 7-10 (180') Step 5: Every team work on the challenge of the previous one on a circular model  Sessions 11,12 (90') Step 6: Work presentations Teams has 15 min. to present their work the mode they choose Collage, video, game, pptx, skets, comic etc The work ought to have among others a. Activities for near environment (family, relatives, friends) b. Engagement of local community suggestions c. Relevant Green skills d. Global action (participation in competitions,conferences, campaigns) e. Bibliography/resources f. Team members names Step 7: Round table discussion and reflective journals highlights
Assessment *Tick one* Formative X Summative Self Peer Other (specify)	Students will be assessed through Reflective Journal technic. This technic will encourage students to keep a journal throughout the project, reflecting on what they are learning, the challenges they face, and their thoughts on climate change. This will provide insights into the students' learning processes and their evolving understanding of the topic.

6.2 Learning Scenario on Circular Economy through Qualifications Based Career Guidance (Q_BCG) approach

Title : Navigating Careers in the Circular Economy - A Qualifications-Based Career Guidance Approach
Aims: -Equip students with a clear understanding of the qualifications (Values, Attitudes, Skills, and Knowledge - VASK) needed for circular economy jobs. -Enable students to identify and develop the specific skills and knowledge areas essential for careers in sustainability and circular economy. Notes for the Teacher: -Ensure that the teaching materials and activities are aligned with the key qualifications needed in the circular economy job market. -Provide constructive feedback during role plays and project presentations to help students refine their understanding and application of essential skills. Total Duration: 12 hours

Session 1-3: Introduction to Circular Economy and Career Opportunities (135')
Step 1: Teacher-Led Introduction (45'): Overview of the circular economy, including key concepts of sustainability, resource efficiency, and waste reduction. Introduction to various career paths within the circular economy. Step 2: Student Exploration (90'): Students research different roles in the circular economy, such as sustainability officer, environmental engineer, renewable energy manager, and materials scientist. Focus on job descriptions, required qualifications and potential career paths. Resources: Websites like LinkedIn, Indeed for job descriptions; circular economy platforms like Ellen MacArthur Foundation.

Session 4-6: Deep Dive into Required Qualifications (135')
Step 3: Group Work (1 hour 30 minutes): In teams, students analyze case studies of successful professionals in the circular economy, identifying key skills and qualifications that contributed to their success. Step 4 : Skill Mapping Exercise (1 hour 30 minutes): Students list the skills and knowledge highlighted in their case studies and map them against their current curriculum and extracurricular activities to identify gaps and opportunities for development. Resources: Professional interviews, case studies from companies leading in sustainability.

Session 7-9: Developing Key Skills for Circular Economy Careers (135')
Step 5: Workshops (3 hours): Conduct workshops focusing on developing specific skills such as critical thinking, project management, and specific technical skills like waste management techniques and sustainable design principles. Step 6: Speakers (optional): Invite professionals from the field to talk about their experiences and the skills they find most valuable in their careers. Resources: Interactive online tools for sustainability education, project management software tutorials.

Session 10-12: Simulation and Role Play (135')
Step 7: Role Play (1 hour 30 minutes): Students simulate a real-world scenario where they must use their knowledge and skills to solve a problem in the circular economy, such as designing a sustainable product or developing a waste reduction strategy for a business. Step 8: Project Development (1 hour 30 minutes): Based on the role play, students develop a project plan that outlines how they would implement their solutions, focusing on the qualifications required to execute these plans successfully. Resources: Role play scripts, project planning templates.

Assessment options
i. Skills Assessment evaluating students based on their participation in workshops and role plays, focusing on the application of circular economy skills. ii. Project Presentation where students present their project plans, assessed on understanding of circular economy principles, innovation, feasibility, and clarity. iii. Reflection Papers where students submit a reflection on what qualifications they believe are most critical for success in the circular economy and how they plan to develop these skills further.

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

Platon Schools

2nd session

Co-funded by the European Union

Project: 2023-2-BG01-KA210-SCH-000185374

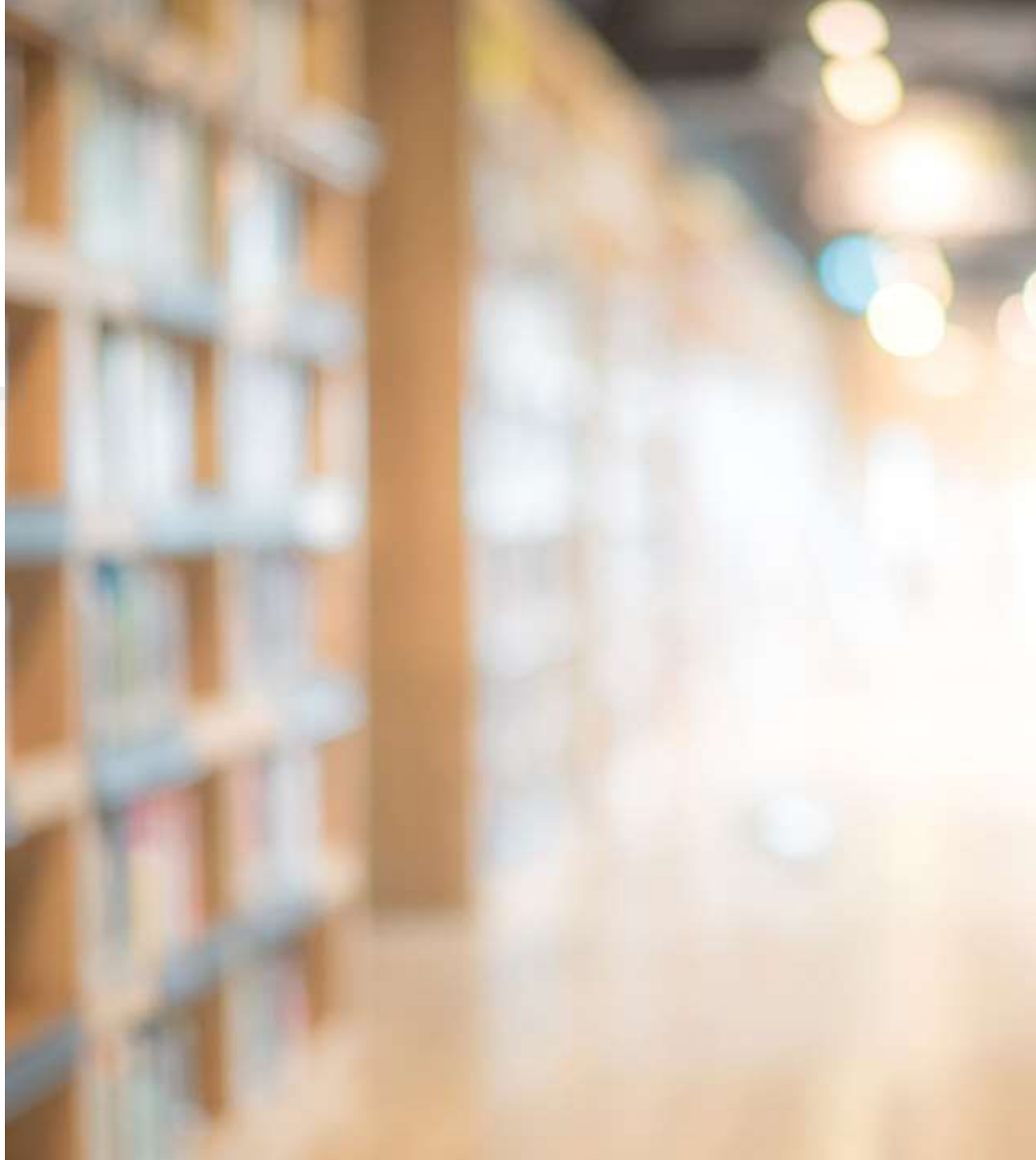
I-STEM methodology with focus on Green skills for girls and online Green STEM Curricula Design Tool

2nd session

Integrative Pedagogy

- Integrative Approach https://www.slideshare.net/MariaTheresaBicarEdar/integrative-teaching-strategies provides learners with a learning environment that helps them make connections of their learning's across curricula. It focuses on connections rather than teaching isolated facts
- To this effect, pedagogy of integration has four objectives (Peyser, Gerard, & Roegiers, 2006):

1. Making sense of the learning process
2. Differentiating matters by relevance
3. Applying the learning to practical situations



Integrated Science, Technology, Engineering, and Math (I-STEM) strategy/methodology

Combines these disciplines into a cohesive learning approach, emphasizing in

a. collaboration

b. interdisciplinarity

c. problem-solving skills

d. applying learners knowledge in practical settings

e. critical thinking

Examples of I-STEM in Sustainability/ Green Education

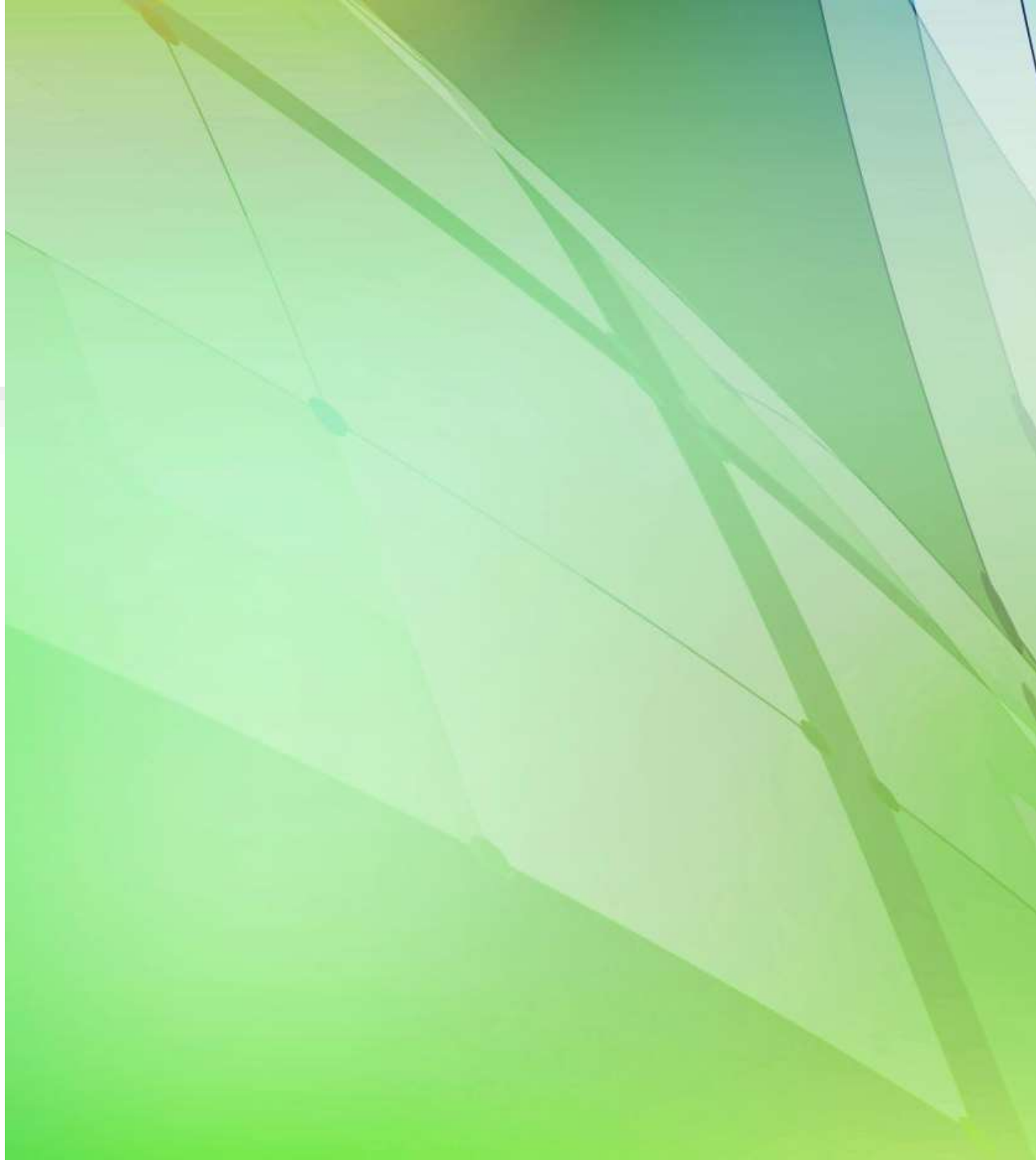
Green Roof Project

Science: Students study the environmental benefits of green roofs, including insulation and biodiversity.

Technology: They use software to design the layout and irrigation systems of a green roof.

Engineering: Students engineer solutions to ensure the structural stability of a green roof on a school building.

Math: They calculate the necessary soil depth and materials needed, considering cost-effectiveness and sustainability.



Task 4: Green Roofs

Brainstorming on MIRO

I-STEM in Promoting Green Skills for Girls

Climate Change and Renewable Energy Module

Science: Girls learn about climate change, its impacts on ecosystems, and the science behind renewable energy sources like solar and wind.

Technology: They use software to simulate the effects of different renewable energy sources on reducing carbon footprints.

Engineering: Design and build models of solar panels or wind turbines to understand the mechanics and engineering challenges involved.

Math: Calculate the potential energy output and savings from their models, using data analysis skills.

Green STEM Curricula Design Tools

Eco-Schools (Europe and Global)
https://eco2-schools.eu/

This international program operated by the Foundation for Environmental Education (FEE) encourages schools to engage in sustainable development education.

Eco-Schools provides a framework for environmental management and certification, along with access to a wealth of resources for curriculum development that includes action plans and learning activities aligned with sustainable practices.

Task 5 : I STEM lesson plan

- Design a lesson plan related to

i. Sustainability/Green Education **or**

ii. Green Skills for Girls

See ideas for titles in pages 5,6

I-STEM Lesson Plan Template

Topic	Environmental Sustainability
Title	Green Roof Project: An Interdisciplinary Approach
Grade	K10 (16yrs)
Approach/Strategy	Integrated STEM
Author(s)	
Learning Objectives	Understand the environmental benefits of green roofs, including insulation properties and biodiversity enhancement. Apply mathematical calculations to design an efficient and sustainable green roof. Use engineering principles to assess the structural requirements of installing a green roof. Utilize technology to simulate and visualize green roof designs.
Classroom settings/materials/ equipments	Computer with internet access and design software (e.g., CAD software) Reference materials on green roofs and their benefits Basic building materials for model creation (cardboard, soil, plant seeds, etc.) Calculators and measurement tools
Sessions	<u>Session 1</u> (45') Activity 1: Introduction (10'): Brief introduction to the concept of green roofs and their relevance to environmental sustainability. Discuss the interdisciplinary nature of the project, highlighting how each STEM component contributes to the overall understanding and implementation. A2: Research and Discussion (30'): Students research the benefits of green roofs in small groups, focusing on insulation and biodiversity. Each group presents their findings, discussing how green roofs can impact urban environments positively. Wrap up: (5') <u>Session 2</u> A3: Review of session 1 (5') A4: Design and Simulation – team work (25'): Using technology tools, students in teams, design their green roof layout. Students use software to simulate how their green roof will perform in different weather conditions and seasons. A5: Presentation (10') Students in teams present their designs Wrap up: (5') <u>Session 3</u> A6: Review of session 2 (5') A7: Engineering and Mathematics Application (25'): Students calculate the necessary materials needed for their design, considering cost-effectiveness and sustainability. A8: Discussion on the engineering challenges of installing green roofs on existing buildings. (10') Wrap up: (5')

	Session 4 A9: Review of session 3 (5') A10: Model Building (30): In groups, students build a small-scale model of their green roof using the calculated materials. Assess the structural stability and practicality of each model. A11: Conclusion (10'): Recap the activities and what was learned in terms of applying STEM to real-world environmental solutions. Discuss the potential impact of green roofs on local ecosystems and urban sustainability.
Assessment	Group presentations on green roof benefits Design and simulation quality Accuracy of mathematical calculations and engineering feasibility Participation and collaboration in activities
Extensions	Ext1: Students can monitor the temperature regulation properties of their models under simulated sunlight conditions. Ext 2: Plan a field trip to a building with a green roof to observe and analyze its practical implementation and effectiveness.

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

Platon Schools

3rd session

Co-funded by the European Union

Project: 2023-2-BG01-KA210-SCH-000185374

The Co-Creation Challenge Based Learning (CCC_BL) approach in the context of Environmental Sustainability

3rd session

What

Through Challenge Based Learning co creation approach students collaboratively design a challenge to be addressed by their peers team enhancing students to:

- actively engaged
- co design and co create didactics pathways
- having the sense of ownership of their learning process
- focus on a specific challenge/topic of Environmental Sustainability
- provide solution

Teachers Role

introduce Environmental Sustainability aspects, challenges/topics

form groups of 4-5 students

apply the circular model

set the task to every team “Design a learning scenario to be addressed by another team”

provide a series of relevant resources

act as facilitator setting inquiry questions during the sessions such as: “go through the resources”, “why do you refer to it”, “what makes you say that”

When

Relevant for students 15 to 17 years

Challenge-based learning using a co-creation (CCC_BL) approach is particularly relevant for students aged 15 to 17 for several key reasons providing a dynamic and interactive educational environment that benefits them by preparing for further education, the workforce and civic life, cultivating a proactive, engaged and capable generation.

i. Enhances engagement since this age group is often characterized by a search for relevance and a desire to engage with real-world issues. When students are involved in co-creating the learning process, they feel a sense of ownership and responsibility towards the outcome, which further enhances their engagement.

When

ii. Develops Critical Thinking and Problem-Solving Skills. CCC_BL challenges students to use critical thinking to explore and solve complex problems. Through co-creation, students contribute their ideas and perspectives, which requires them to evaluate information critically, make decisions, and think creatively.

iii. Fosters Collaboration and Communication through Co-creation involving students working in teams to solve challenges, which naturally develops their collaboration and communication skills. As they negotiate, share ideas, and combine their strengths, students learn valuable interpersonal skills that are crucial in both personal and professional contexts.

iv. Encourages Practical Application of Knowledge connecting academic theories to real-world applications, making learning more practical and tangible. Students aged 15 to 17 are at a critical juncture where they begin considering future career paths and educational opportunities. Seeing how academic concepts apply in real-world scenarios can help them make informed decisions about their futures.

Environmental Sustainability Challenges/Topics

i.Climate Change: Understanding the causes, impacts, and solutions to climate change is essential for sustainability education.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en

The EEA provides comprehensive reports and data on the state of the environment in Europe, including climate change impacts and adaptation strategies.

ii. Biodiversity: The study of ecosystems, species diversity, and the impacts of human activity on natural habitats.

Website: EUROPARC Federation https://www.europarc.org/

EUROPARC is a network of protected areas in Europe that works to improve the management of natural areas for biodiversity conservation.

Environmental Sustainability Challenges/Topics

iii. Renewable Energy and Energy Efficiency: Promoting the use of renewable energy sources and improving energy efficiency across sectors.

Website: European Renewable Energy Council (EREC) https://www.erec.org/

EREC is an umbrella organization of European renewable energy industry, trade, and research associations, providing policy guidance and updates on renewable energy developments.

iv. Sustainable Transport: Developing transportation strategies that reduce environmental impact, including promoting public transport and non-motorized mobility.

Website: Transport & Environment (T&E) https://www.transportenvironment.org/

T&E is a leading Brussels-based organization promoting, at the EU and global level, policy that ensures cleaner, safer, smarter transport.

v. Resource Efficiency and Waste Management: Enhancing efficiency in the use of resources while reducing waste production and improving recycling and upcycling practices.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en/topics/at-a-glance/economy-and-resources

The EEA also provides extensive resources on waste generation and management practices across Europe, aiming to support sustainable waste policies.

Task 6 : CCC_BL lesson plan

- Design a lesson plan related to

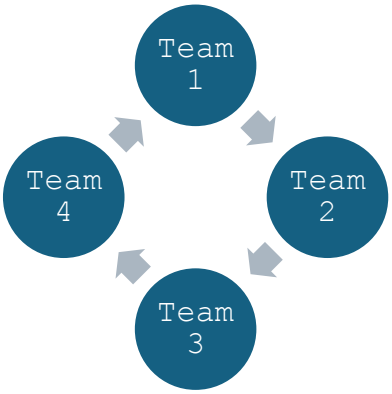
i. Sustainability/Green Education **or**

ii. Green Skills for Girls

See ideas for titles in slides 7,8

Learning Scenario on Environmental Sustainability through Co-Creation Challenge Based Learning (CCC_BL) approach

Title	Addressing Environmental Sustainability through Co Creation Challenge based approach	
Author		
Language:	En	
Institution:	Platon	
Platform information:	Link:	
	Login:	
	Password:	
Target group:	Age:	15-17
	Grade:	K9-K11
	Type of School:	General Education
Aims:	Students to: -actively engaged -co design and co create didactics pathways -having the sense of ownership of their learning process -focus on a specific challenge/topic of Environmental Sustainability -provide solution	
Keywords *Use # in front*	#green skills #environmental sustainability #challenge based learning #co creation #solutions #students #collaborative	
Background knowledge:	"Learners with the willingness to acquire the skills and knowledge required for the green transition need to have easier access to qualified instructors and revamped curricula" Asikainen, T., Bitat, A., Bol, E., Czako, V., Marmier, A., Muench, S., Murauskaite-Bull, I., Scapolo, F.,Stoermer, E. The future of jobs is green, EUR 30867 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42571-7, doi:10.2760/218792, JRC126047	
Strategy/Technic	Challenge Based Learning co creation approach (CBLcc)	
	Short description: Through Challenge Based Learning co creation approach students collaboratively design a challenge to be addressed by their peers team	
Time *Use hours*	12	
Bibliography:	https://education-for-climate.ec.europa.eu/community/ https://www.eea.europa.eu/en	
Notes for the teacher:	-the Teacher introduce Environmental Sustainability aspects -form groups of 4-5 students -set the task to every team "Design a learning scenario to be addressed by another team"	

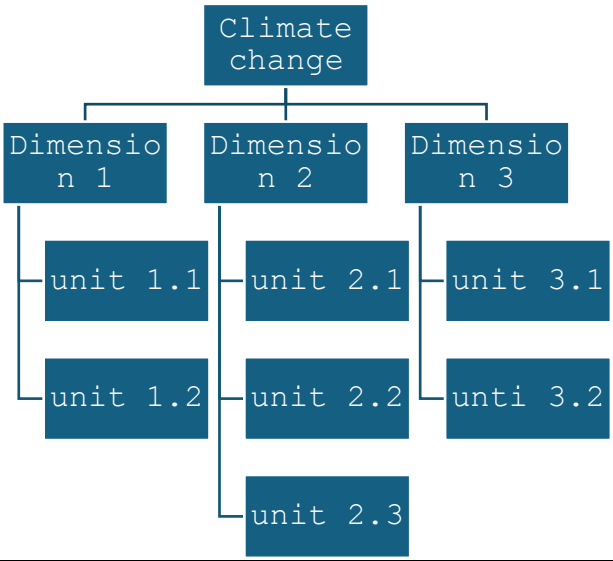
	-apply the circular model  -provide a series of relevant resources -act as facilitator setting inquiry questions during the sessions such as: “go through the resources”, “why do you refer to it”, “what makes you say that”
Activities performed by students: *Use steps to describe all activities, put them in the order they appear in the guidance and estimated time (e.g. 20’)*	Session 1,2 (90’ min.) Step 1: What is Environmental Sustainability – introduction from teacher Environmental sustainability is a critical focus in education, and several European initiatives and organizations provide resources and support to integrate sustainability into educational curricula. Here are four relevant European sites that are actively involved in promoting environmental sustainability through education: i.Education for Climate (European Commission): https://education-for-climate.ec.europa.eu/community/ This initiative by the European Commission aims to support and enhance the role of education in achieving climate neutrality by 2050. The platform offers a wide range of resources, policies, and best practices for integrating climate education and environmental sustainability into schools and educational systems across the EU. ii. SEEd - Sustainability and Environmental Education (UK): https://se-ed.org.uk/ SEEd is a UK-based charity that supports educators, schools, and communities in developing and embedding sustainability and environmental education. The organization provides resources, training, and guidance to help educators integrate sustainability themes across the curriculum. iii. Foundation for Environmental Education (FEE) (Denmark): https://www.fee.global/ FEE is a global organization based in Denmark that promotes sustainable development through environmental education. It is known for programs like Eco-Schools, Young Reporters for the Environment, and Learning about Forests, which provide frameworks and resources for schools worldwide, including Europe, to engage in sustainability education. iv. Eco-Schools (Europe and Global): https://www.ecoschools.global/ Eco-Schools is one of the largest global sustainable schools programs, which encourages young people to engage with their environment by allowing them the opportunity to actively protect it. It provides a framework to help embed ecological principles into the heart of school life, affecting long-term behavior of students, staff, families, and local authorities.

Step 2: Teams of 4-5 students formulation
Optional – roles definitions: Designer, Researcher(s), Writer, Presenter

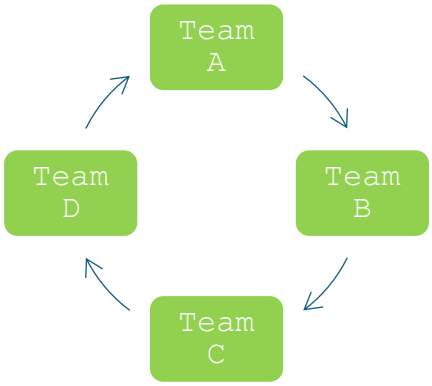
Step 3: Challenge/topic selection from every team
Environmental sustainability encompasses a broad range of challenges/topics, each crucial for addressing the various aspects of humanity's impact on the planet. Here are several key challenges/topics along with reputable websites where you can find reliable information, educational resources, and the latest research:
i. Climate Change: Understanding the causes, impacts, and solutions to climate change is essential for sustainability education.
Website: European Environment Agency (EEA) https://www.eea.europa.eu/en
The EEA provides comprehensive reports and data on the state of the environment in Europe, including climate change impacts and adaptation strategies.
ii. Biodiversity: The study of ecosystems, species diversity, and the impacts of human activity on natural habitats.
Website: EUROPARC Federation https://www.europarc.org/
EUROPARC is a network of protected areas in Europe that works to improve the management of natural areas for biodiversity conservation.
iii. Renewable Energy and Energy Efficiency: Promoting the use of renewable energy sources and improving energy efficiency across sectors.
Website: European Renewable Energy Council (EREC) https://www.erec.org/
EREC is an umbrella organization of European renewable energy industry, trade, and research associations, providing policy guidance and updates on renewable energy developments.
iv. Sustainable Transport: Developing transportation strategies that reduce environmental impact, including promoting public transport and non-motorized mobility.
Website: Transport & Environment (T&E) https://www.transportenvironment.org/
T&E is a leading Brussels-based organization promoting, at the EU and global level, policy that ensures cleaner, safer, smarter transport.
v. Resource Efficiency and Waste Management: Enhancing efficiency in the use of resources while reducing waste production and improving recycling and upcycling practices.
Website: European Environment Agency (EEA)
https://www.eea.europa.eu/en/topics/at-a-glance/economy-and-resources
The EEA also provides extensive resources on waste generation and management practices across Europe, aiming to support sustainable waste policies.
vi. Water Conservation and Management: Addressing water scarcity and quality issues through sustainable water management practices.
Website: European Water Association (EWA) https://www.ewa-online.eu/
EWA is dedicated to the management of water resources in Europe, promoting sustainable water management practices through research and policy advocacy.

Session 3-6 (180')
Step 4: Design and development of the challenge
Every team will create a learning scenario to drive next team completing the template

Title	

	Big picture		
	Articulation	*It can be done by a video, skets, article, movie etc* *Able to attract the interest of their peers*	
	Resources	*Data, articles, journals, websites, blogs etc*	
	Mode	*ppts, video, collage , skets, comic, game etc.*	
	Writers		

Sessions 7-10 (180')
Step 5: Every team work on the challenge of the previous one on a circular model



Sessions 11,12 (90')
Step 6: Work presentations
Teams has 15 min. to present their work the mode they choose
Collage, video, game, pptx, skets, comic etc
The work ought to have among others
a. Activities for near environment (family, relatives, friends)
b. Engagement of local community suggestions
c. Relevant Green skills
d. Global action (participation in competitions,conferences, campaigns)

	e. Bibliography/resources f. Team members names Step 7: Round table discussion and reflective journals highlights
Assessment *Tick one* Formative X Summative Self Peer Other (specify)	Students will be assessed through Reflective Journal technic. This technic will encourage students to keep a journal throughout the project, reflecting on what they are learning, the challenges they face, and their thoughts on climate change. This will provide insights into the students' learning processes and their evolving understanding of the topic.

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach

Platon Schools

4th session

Co-funded by the European Union

Project: 2023-2-BG01-KA210-SCH-000185374

The Qualifications Based Career Guidance (Q_BCG) on Circular Economy

4th session

What

- Qualifications are a set of Values, Attitudes, Skills and Knowledge (VASK) prerequisite in the Job Market. This is attested by studies, diplomas, certifications, awards, recommendation letters, testimonials etc. according to job specifications.

Teachers role

Play	Organize and guide	Assist	Support
play a pivotal role as facilitators and resource providers.	organize and guide the initial assessment of the school's environment and student needs, select appropriate job-related resources,	assist students in researching and understanding job market requirements.	support students in preparing and delivering presentations, fostering a comprehensive understanding of career pathways.

When & Why

It is suggested for 15 to 17 yrs students

The Qualifications Based Career Guidance (Q_BCG) approach is particularly relevant for students aged 15 to 17 as it aligns closely with the critical stage where they begin to make pivotal decisions about their future educational and career paths.

This approach helps students understand the real-world requirements of various professions, including necessary qualifications such as Values, Attitudes, Skills, and Knowledge (VASK), which are crucial for success in the job market.

When & Why

The Q_BCG approach is highly beneficial for students aged 15 to 17 for several reasons:

I. **Career Awareness** by assisting students gain early awareness of various career options and the qualifications required for those roles. This knowledge can steer their academic and extracurricular choices towards fields they are genuinely interested in and are required by potential careers.

II. **Informed Decision-Making** by understanding the qualifications needed for specific jobs, students can make more informed decisions about their education and career paths. This includes choosing relevant subjects, courses and training programs that align with their career goals.

When & Why

iii. **Motivation and Goal Setting** by understanding what qualifications are needed for desired jobs can motivate students to set realistic academic and career goals. This clarity can increase their motivation to excel in specific areas of study or develop skills crucial for their chosen career paths.

iv. **Enhances Employability** through early exposure to the qualifications required in the job market helps students to focus on acquiring these credentials and skills, thus enhancing their employability and readiness for the workforce.

v. **Personal Development** by encouraging personal development and promoting values and attitudes alongside skills and knowledge. This holistic development is crucial as employers increasingly look for well-rounded candidates who not only possess technical skills but also exhibit strong interpersonal and ethical qualities.

Environmental Sustainability Challenges/Topics

i.Climate Change: Understanding the causes, impacts, and solutions to climate change is essential for sustainability education.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en

The EEA provides comprehensive reports and data on the state of the environment in Europe, including climate change impacts and adaptation strategies.

ii. Biodiversity: The study of ecosystems, species diversity, and the impacts of human activity on natural habitats.

Website: EUROPARC Federation https://www.europarc.org/

EUROPARC is a network of protected areas in Europe that works to improve the management of natural areas for biodiversity conservation.

Environmental Sustainability Challenges/Topics

iii. Renewable Energy and Energy Efficiency: Promoting the use of renewable energy sources and improving energy efficiency across sectors.

Website: European Renewable Energy Council (EREC) https://www.erec.org/

EREC is an umbrella organization of European renewable energy industry, trade, and research associations, providing policy guidance and updates on renewable energy developments.

iv. Sustainable Transport: Developing transportation strategies that reduce environmental impact, including promoting public transport and non-motorized mobility.

Website: Transport & Environment (T&E) https://www.transportenvironment.org/

T&E is a leading Brussels-based organization promoting, at the EU and global level, policy that ensures cleaner, safer, smarter transport.

v. Resource Efficiency and Waste Management: Enhancing efficiency in the use of resources while reducing waste production and improving recycling and upcycling practices.

Website: European Environment Agency (EEA) https://www.eea.europa.eu/en/topics/at-a-glance/economy-and-resources

The EEA also provides extensive resources on waste generation and management practices across Europe, aiming to support sustainable waste policies.

Task 8 : Q_BCG scenario

Design a scenario related to

i. Sustainability/Green Education **or**

ii. Green Skills for Girls

See ideas for titles in slides 8,9

Learning Scenario on Circular Economy through Qualifications Based Career Guidance (Q_BCG) approach

Title : Navigating Careers in the Circular Economy - A Qualifications-Based Career Guidance Approach

Aims:
-Equip students with a clear understanding of the qualifications (Values, Attitudes, Skills, and Knowledge - VASK) needed for circular economy jobs.
-Enable students to identify and develop the specific skills and knowledge areas essential for careers in sustainability and circular economy.

Notes for the Teacher:
-Ensure that the teaching materials and activities are aligned with the key qualifications needed in the circular economy job market.
-Provide constructive feedback during role plays and project presentations to help students refine their understanding and application of essential skills.

Total Duration: 12 hours

Session 1-3: Introduction to Circular Economy and Career Opportunities (135')

Step 1: Teacher-Led Introduction (45'): Overview of the circular economy, including key concepts of sustainability, resource efficiency and waste reduction. Introduction to various career paths within the circular economy.

Step 2: Student Exploration (90'): Students research different roles in the circular economy, such as sustainability officer, environmental engineer, renewable energy manager, and materials scientist. Focus on job descriptions, required qualifications and potential career paths.
Resources: Websites like LinkedIn, Indeed for job descriptions; circular economy platforms like Ellen MacArthur Foundation.

Session 4-6: Deep Dive into Required Qualifications (135')

Step 3: Group Work (1 hour 30 minutes): In teams, students analyze case studies of successful professionals in the circular economy, identifying key skills and qualifications that contributed to their success.

Step 4 : Skill Mapping Exercise (1 hour 30 minutes): Students list the skills and knowledge highlighted in their case studies and map them against their current curriculum and extracurricular activities to identify gaps and opportunities for development.
Resources: Professional interviews, case studies from companies leading in sustainability.

Session 7-9: Developing Key Skills for Circular Economy Careers (135')

Step 5: Workshops (3 hours): Conduct workshops focusing on developing specific skills such as critical thinking, project management, and specific technical skills like waste management techniques and sustainable design principles.

Step 6: Speakers (optional): Invite professionals from the field to talk about their experiences and the skills they find most valuable in their careers.
Resources: Interactive online tools for sustainability education, project management software tutorials.

Session 10-12: Simulation and Role Play (135')
Step 7: Role Play (1 hour 30 minutes): Students simulate a real-world scenario where they must use their knowledge and skills to solve a problem in the circular economy, such as designing a sustainable product or developing a waste reduction strategy for a business. Step 8: Project Development (1 hour 30 minutes): Based on the role play, students develop a project plan that outlines how they would implement their solutions, focusing on the qualifications required to execute these plans successfully. Resources: Role play scripts, project planning templates.

Assessment options
i. Skills Assessment evaluating students based on their participation in workshops and role plays, focusing on the application of circular economy skills. ii. Project Presentation where students present their project plans, assessed on understanding of circular economy principles, innovation, feasibility, and clarity. iii. Reflection Papers where students submit a reflection on what qualifications they believe are most critical for success in the circular economy and how they plan to develop these skills further.

Project Planning Template

Sustainable Packaging Development

Project Title	Eco-Pack Initiative
Project Manager/Lead	
Team members	
Project Description	The Eco-Pack Initiative aims to develop biodegradable packaging solutions for the food industry, reducing waste and environmental impact.
Objectives	Develop a fully biodegradable packaging solution. Test the effectiveness and durability of the packaging. Launch a pilot program with local food vendors.
Start - End Date	
Budget	
Qualifications	**Phase 1: Research and Design** Technical Skills: Knowledge of polymer science and materials engineering. Soft Skills: Creativity in design, problem-solving capabilities. Certifications: Certified Packaging Professional (CPP) preferred. **Phase 2: Development and Testing** Technical Skills: Expertise in product testing methodologies and environmental impact assessment. Soft Skills: Attention to detail, analytical skills. Certifications: Project Management Professional (PMP) for leading the development process. **Phase 3: Pilot Implementation** Technical Skills: Experience in supply chain management and pilot project execution. Soft Skills: Strong communication skills for coordinating with vendors and partners; leadership skills. Certifications: Lean Six Sigma for process improvement (optional but beneficial).
Resources/ materials	Biodegradable materials, testing chemicals.
Technology	Design software, testing equipment.
Timeline	Phase 1: [Description and timeline] Phase 2: [Description and timeline] Phase 3: [Description and timeline]

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach

Platon Schools

5th session

Co-funded by the European Union

Project: 2023-2-BG01-KA210-SCH-000185374

Environmental Sustainability (ES)

5th session

Hierarchical Levels

DOMAIN: This is the broadest category, representing a significant field of focus or interest.

Aspect: These are major divisions within a domain, categorizing broad thematic areas.

Topic: Topics narrow down the aspect into more specific areas of study.

Subtopic: Subtopics break down the topic further into more detailed sections.

Concept: Concepts are the underlying principles or ideas that define the subtopics.

Details/Elements: These are specific examples, techniques, methods, or case studies that illustrate the concept in practice.

Applications: This level provides specific examples of how the details or techniques are applied in real-world settings, showcasing the practical impact and effectiveness of sustainability strategies.

DOMAIN - 1.1 ENVIRONMENTAL SUSTAINABILITY (ES)

Aspects

i. Conservation of Resources

This involves the sustainable management and use of natural resources like water, soil, and forests to prevent depletion and maintain biodiversity.

ii. Pollution Reduction

Reducing emissions, waste, and chemical pollutants to protect air, water, and soil quality. Initiatives include recycling, renewable energy adoption, and green manufacturing processes.

iii. Sustainable Energy

Transitioning from fossil fuels to renewable energy sources such as solar, wind, and hydroelectric power to reduce carbon footprints and mitigate climate change.

iv. Ecosystem Management

Preserving ecosystems through protected areas and wildlife conservation, ensuring that natural habitats and the species they support can thrive.

v. Economic Sustainability

Integrating environmental concerns into economic decisions to foster industries that do not harm the environment, thus supporting long-term ecological balance.

Aspect - 1.1.i.Conservation of Resources
Topics

1.1.i.1 Resource Management includes techniques and strategies for managing natural resources sustainably without depleting them.

1.1.i.2 Water Conservation provide practices to reduce water usage and waste in both residential and industrial sectors.

1.1.i.3 Forest Management through approaches for sustainable forestry that prevent deforestation and promote reforestation.

1.1.i.4 Soil Conservation by methods to prevent soil erosion and degradation to maintain soil health and productivity.

Task 9 Padlet

Suggest topics for

ii. Pollution Reduction

Reducing emissions, waste, and chemical pollutants to protect air, water, and soil quality. Initiatives include recycling, renewable energy adoption, and green manufacturing processes.

Topic - 1.1.i.1 Resource Management
Subtopics

Strategies for Sustainable Resource Management

S1:Integrated Water Resources Management *(IWRM)* is a process that promotes the coordinated development and management of water, land, and related resources in order to maximize economic and social welfare without compromising the sustainability of vital ecosystems. Helps to balance water use between agricultural, industrial, and domestic needs, ensuring sustainable water supplies for future generations.

S2:Ecosystem-Based Management *(EBM)* is a comprehensive approach that integrates the entire ecosystem, including humans, into resource management decisions. This strategy is used to sustainably manage natural resources by considering the cumulative impacts of different activities and prioritizing the health of the ecosystem as a whole. Maintains ecosystem resilience, supports biodiversity, and provides sustainable benefits to communities from natural resources.

Sub topic - Integrated Water Resources Management (IWRM) Key Concepts

1.Water Cycle Management recognizes that all parts of the water cycle are interconnected, from rainfall to river basins to aquifers, and manages them holistically.

2.Ecosystem-Based Approach incorporates the protection of ecosystems into water management strategies to maintain the ecological health of water bodies and their surrounding environments.

3.Public Participation engages communities, stakeholders, and the public in the planning and decision-making processes for water management.

4.Cross-Sectoral Integration coordination among various sectors that impact or are impacted by water management, such as agriculture, industry, urban development and energy.

5.Demand Management focuses on managing and reducing the demand for water, rather than solely increasing supply, through measures such as water-efficient technologies, water pricing, and conservation education.

6.Policy and Institutional Coordination develops coherent policies, laws, and institutions at all levels (local, national, international) that govern water resources effectively.

7.Risk Management and Adaptation incorporates strategies to manage risks related to water scarcity, pollution, and climate change impacts, adapting management practices to changing conditions.

Task 10: Water Conservation

Suggest Subtopics and Concepts

For the topic: 1.1.i.2 Water Conservation

Open online course for teachers Green Qualifications and Career guidance through Co-Creation Challenge based learning approach (CCC_BL)

Platon Schools

Co-funded by the European Union

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ALDA ASSOCIATION

ΕΚΠΑΙΔΕΥΤΗΡΙΑ ΠΛΑΤΩΝ

AFL

Key Aspects of Environmental Sustainability

1. Conservation of Resources: Sustainable management of water, soil, and forests to prevent depletion.

2. Pollution Reduction: Reduce emissions, waste, and pollutants through recycling, renewable energy and green manufacturing.

3. Sustainable Energy: Transition to renewable energy sources like solar, wind and hydroelectric power.

4. Ecosystem Management: Preserve natural habitats via protected areas and wildlife conservation.

5. Economic Sustainability: Foster industries that integrate environmental concerns into economic decisions.

Circular Economy (CE)

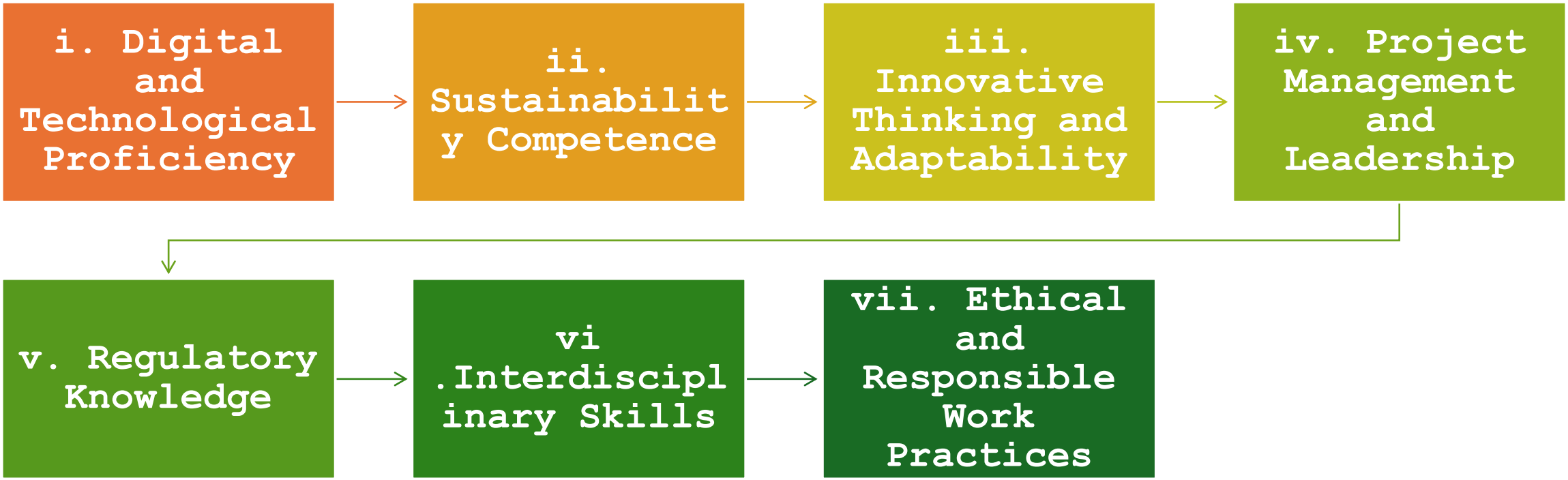
is built on three key principles

i. Design Out Waste and Pollution: By redesigning processes and products, waste and pollution are not created in the first place, as materials are designed for reuse or safe return to the environment.

ii. Keep Products and Materials in Use: Products are designed for durability, reuse, remanufacturing and recycling to keep materials circulating within the economy without entering the waste stream.

iii. Regenerate Natural Systems: Instead of merely minimizing harm to the environment, the circular economy emphasizes restoring and regenerating natural systems, enhancing the quality and availability of natural resources. This approach fosters resilience and sustainability by aligning economic practices with ecological principles.

Green and Circular skills for nowadays and future labor market



I-STEM in Promoting Green Skills for Girls

Climate Change and Renewable Energy Module

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Technology: They use software to simulate the effects of different renewable energy sources on reducing carbon footprints.

Engineering: Design and build models of solar panels or wind turbines to understand the mechanics and engineering challenges involved.

Math: Calculate the potential energy output and savings from their models, using data analysis skills.

The Co-Creation Challenge Based Learning (CCC_BL) approach in the context of Environmental Sustainability

The Qualifications Based Career Guidance (Q_BCG) on Circular Economy

Hierarchical Levels

DOMAIN: This is the broadest category, representing a significant field of focus or interest.

Aspect: These are major divisions within a domain, categorizing broad thematic areas.

Topic: Topics narrow down the aspect into more specific areas of study.

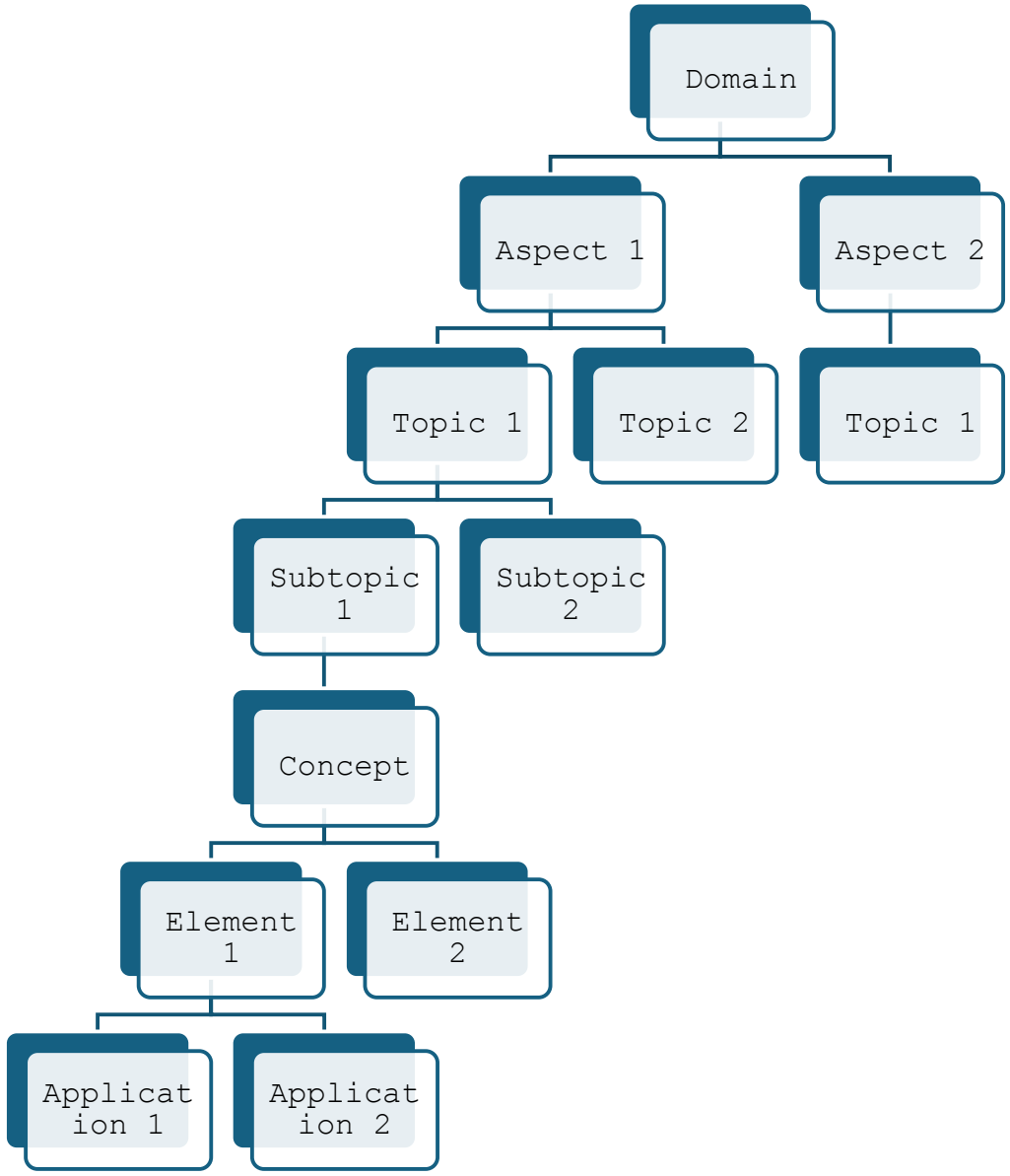
Subtopic: Subtopics break down the topic further into more detailed sections.

Concept: Concepts are the underlying principles or ideas that define the subtopics.

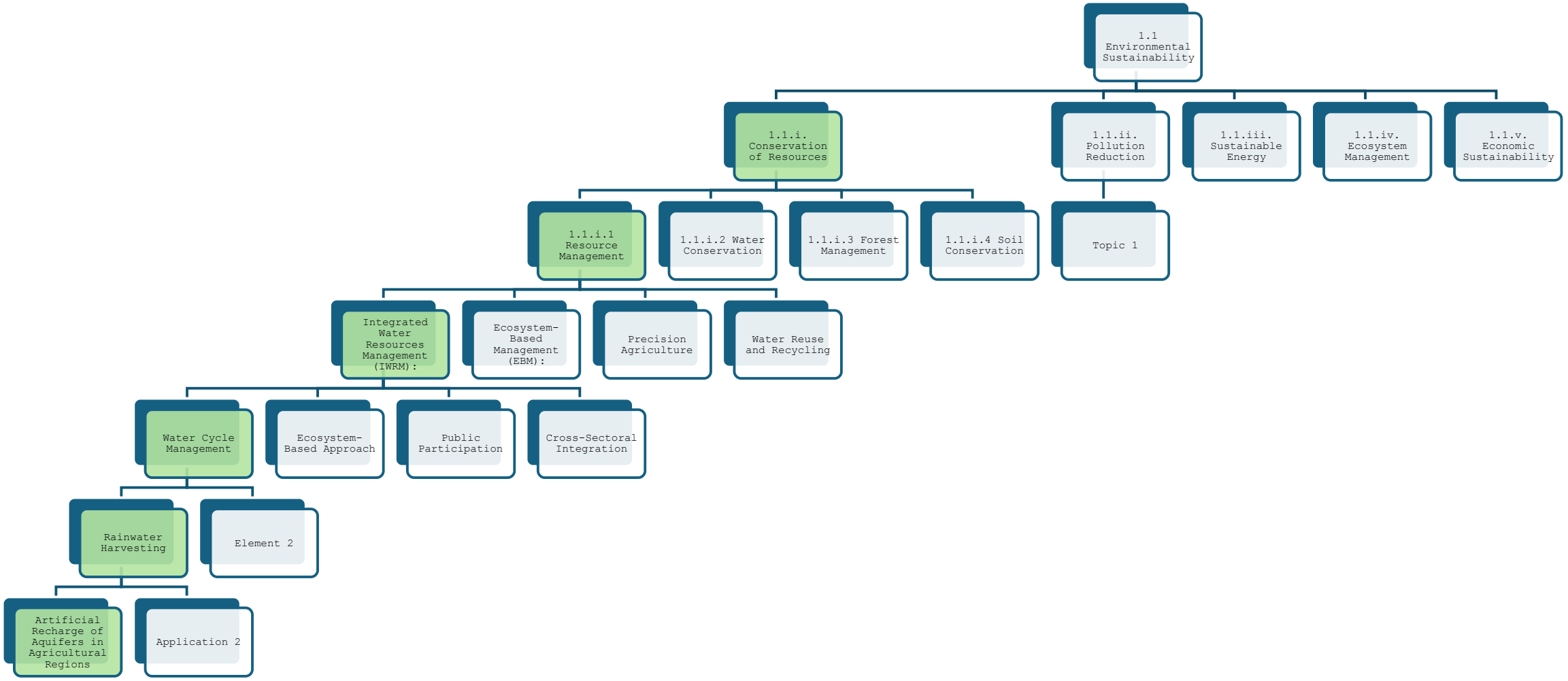
Details/Elements: These are specific examples, techniques, methods, or case studies that illustrate the concept in practice.

Applications: This level provides specific examples of how the details or techniques are applied in real-world settings, showcasing the practical impact and effectiveness of sustainability strategies.

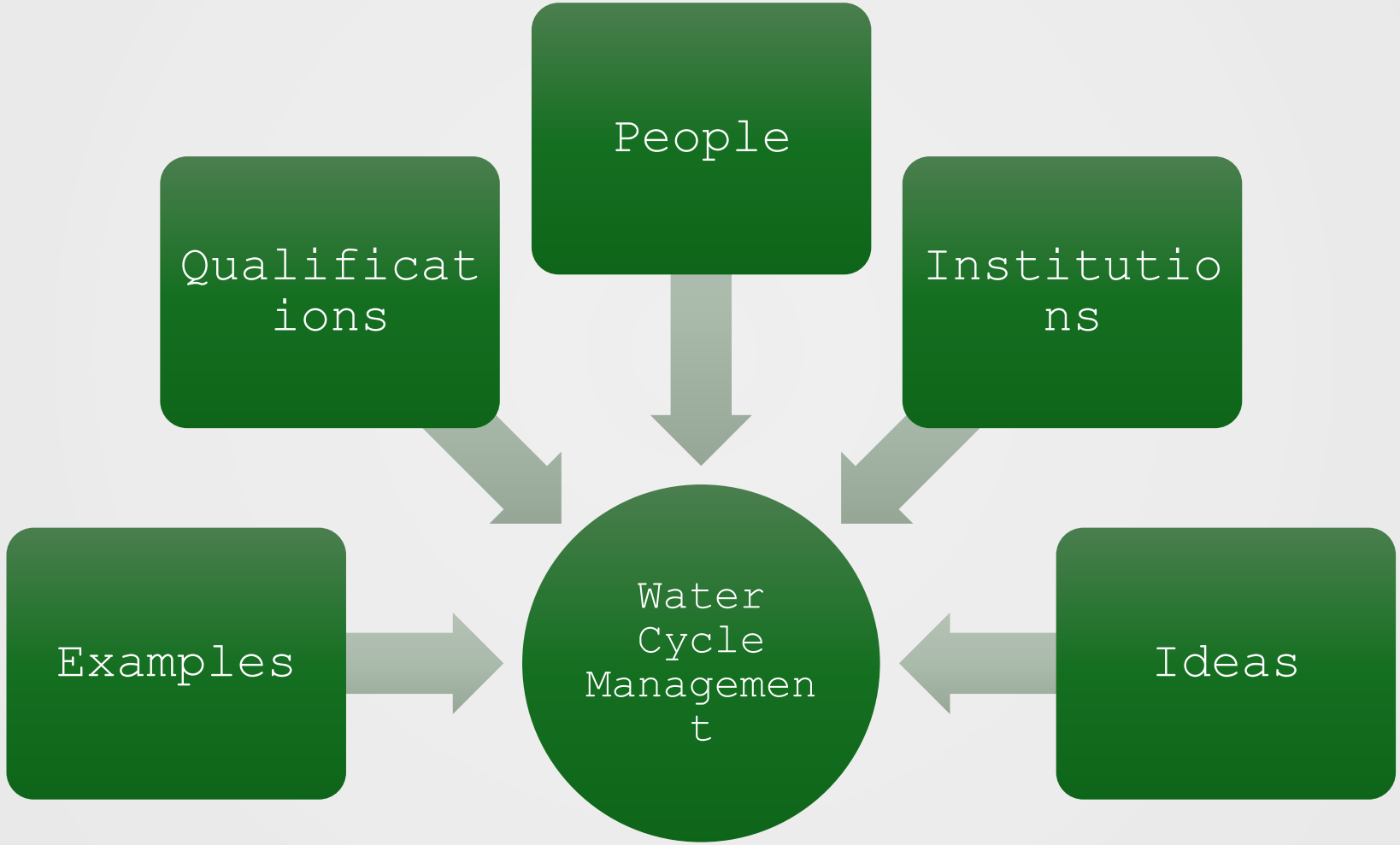
Hierarchical Levels



Hierarchical Levels



Building around an Element (6th level) of ES



Follow up

- **Certification of Attendance**

including description of training content (learning outcomes) and time input – EUROPASS (Digital)

- **The winner**

participate in the conference and present her/his lesson plans and experiences

- **GGG Academy**

as continuation of the Erasmus+