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Unit 3. ECOSYSTEM AT RISK: CLIMATE CHANGE IMPACT



BIOS4YOU
AR 2.0

BIO-INSPIRED STEM TOPICS FOR ENGAGING YOUNG GENERATIONS
THANKS TO THE USE OF AUGMENTED REALITY

Project Number: 2023-1-DE03-KA220-SCH-000126516

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Table of Contents

General information.....2
Pedagogical specifications.....5
Technical specifications7





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General information

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Name of the
exercise:

Eco-Quiz: Ecosystems at Risk

Description of the
exercises:

This activity uses Delightex Studio to create an interactive quiz with 6 multiple-choice questions based on the learning unit *Ecosystem at Risk: Climate Change Impact*.

The quiz helps students consolidate key ideas from the unit, such as:

- how climate change affects ecosystems,
- what ecosystem tipping points are,
- how cascading effects work in food webs,
- why terrestrial, freshwater, and marine ecosystems are vulnerable,
- how nature-based solutions can increase ecosystem resilience.

Students receive immediate feedback after each answer. Correct answers reinforce understanding, while incorrect answers encourage students to rethink and review the learning content. The activity is designed as individual work, with the option of a short group reflection afterwards.

Participants:

Students (individual participation).

Optional teacher-guided reflection after the quiz.

Participants' age
range:

14–18 years.

Basic understanding of: ecosystems and food chains, climate change impacts, reading short scientific texts and answering comprehension questions.

STEM subject and
specific topic:

Biology / Environmental Science.

Topic: Climate change impacts on ecosystems, tipping points, resilience, and adaptation.

Gamification
process:

The quiz is designed as a mission called **“Become an Eco-Guardian.”** Students progress step by step through the questions. Each correct answer symbolises protecting an ecosystem, while incorrect answers represent increased risk and encourage students to think again. At the end of the quiz, students receive a short summary message recognising their effort and learning





Written or graphic
description of
Augmented info:

progress.

Introductory screen (text)

Welcome, Eco-Guardian!

Climate change is transforming ecosystems all over the world. Forests, rivers, lakes, and oceans are under increasing pressure due to rising temperatures and changing weather patterns.

In this quiz, you will test your understanding of ecosystem risks, tipping points, and solutions that help nature become more resilient.

Think carefully before you answer — every choice helps you understand how ecosystems are affected and how they can be protected.

Are you ready? Let's begin!

Quiz structure (6 questions, multiple choice)

Example topics covered in the quiz

- What ecosystem tipping points are
- Why limiting global warming is important
- How cascading effects spread through ecosystems
- Which ecosystems are most vulnerable
- How climate change affects freshwater systems
- What nature-based solutions are and why they matter

(The quiz contains 6 questions with 4 answer options each.)

Final screen (text)

Mission complete!

You explored how climate change affects ecosystems, why some changes can become irreversible, and how nature-based solutions can help ecosystems stay resilient.

Remember:

-  Healthy ecosystems support biodiversity.
-  Nature can help protect people and the environment.
-  Every action matters when it comes to climate change.





You are now one step closer to being a true **Eco-Guardian** 

External (or extra)
tools required

Links (video,
images, text online
and so on).

Delightex Studio (web-based; free version is sufficient)
Computer, tablet, or smartphone with internet connection

Delightex Studio: <https://edu.delightex.com/>

Source text (Unit 3: Ecosystem at Risk) – provided by teacher





Pedagogical specifications

How can this augmented information be used to address a STEAM topic in a more interesting way for students?

The augmented quiz created in Delightex transforms abstract scientific concepts into an interactive learning experience. Instead of only reading about climate change and ecosystems, students actively engage with the content through visual elements, short challenges, and immediate feedback. The use of Augmented Reality supports STEAM learning by combining scientific knowledge with digital technology and problem-solving tasks. The mission-based format encourages curiosity and sustained attention, helping students understand complex ideas such as ecosystem tipping points and cascading effects in a clear and accessible way.

Which pedagogical objectives are addressed through this scenario?

This scenario addresses the following pedagogical objectives:

- to consolidate understanding of climate change impacts on ecosystems;

- to support the application of scientific knowledge in a digital environment;

- to develop critical thinking through decision-making and feedback;

- to strengthen digital competence and responsible use of technology;

- to encourage independent learning and self-reflection





Which results are expected to be reached with its use?

After completing the augmented quiz, students are expected to:

- explain how climate change affects terrestrial, freshwater, and marine ecosystems;

- describe ecosystem tipping points and cascading effects using correct terminology;

- identify nature-based solutions and explain their role in ecosystem resilience;

- demonstrate improved understanding of key concepts through correct quiz responses;

- participate more confidently in discussions related to environmental issues.

Which benefits are expected to be reached with its use?

The expected benefits of using this augmented activity include:

- increased student engagement and motivation;

- better retention of scientific concepts through active learning;

- reduced anxiety compared to traditional assessment formats;

- improved accessibility for students with different learning styles;

- stronger connection between theoretical knowledge and real-world environmental challenges.





Technical specifications

AR INFORMATION

Technology

Delightex Studio (web-based)

<https://edu.delightex.com/Studio/Spaces>

If it's needed a marker, description of the marker

<https://edu.delightex.com/LNL-SYJ>



Hardware

and software
needed:

PC, tablet, or smartphone with internet connection. Camera-enabled device (optional, for AR interaction). Delightex Studio account (teacher); students only need the access link

Type of Augmented data

Images: background visuals representing vulnerable ecosystems (e.g. Arctic ice, rainforests, coral reefs)

Text: quiz questions, answer options, feedback messages, final reflection message

3D models: ecosystem guardians (e.g. whale, coral, tree) from the Delightex asset library





Written description of the AR data

Students begin the activity by opening the quiz link in Delightex Studio. An introductory screen invites them to take part in a short mission focused on ecosystems at risk due to climate change. The activity is designed as an interactive True / False quiz, directly based on the learning unit ECOSYSTEM AT RISK: CLIMATE CHANGE IMPACT.

The quiz consists of 10 statements, each related to key ideas from the unit text. For every statement, students must decide whether it is true or false. This format supports clear decision-making and allows students to focus on understanding cause-and-effect relationships within ecosystems.

The quiz addresses the following key topics:

- climate change as a global environmental challenge,
- strong connections between ecosystems, the atmosphere, and the oceans,
- ecosystem tipping points and the risk of abrupt and irreversible change,
- cascading effects when one part of an ecosystem is disturbed,
- threats to terrestrial, freshwater, and marine ecosystems,
- the role of nature-based solutions in strengthening ecosystem resilience.

Each statement is displayed on the screen together with two answer options: **True** and **False**. After selecting an answer, students receive **immediate interactive feedback**:

- if the answer is correct, a short confirmation message reinforces the concept;
- if the answer is incorrect, a brief explanatory message clarifies why the statement is false and supports learning.

This feedback approach is both **evaluative and instructional**, helping students understand key concepts rather than simply marking answers as right or wrong.

After completing all ten statements, students reach a final screen with a summary message. This closing screen reinforces the main ideas of the unit, highlights the importance of ecosystem protection and resilience, and encourages reflection on how climate change affects natural systems.





If Image

Background images visually represent ecosystems under climate stress, such as polar regions, freshwater environments, forests, and coral reefs. These visuals support understanding and engagement.

If Text

Introductory screen:

Climate change is transforming ecosystems across the planet. Forests, rivers, lakes, and oceans are under increasing pressure due to rising temperatures, changing weather patterns, and human activities. In this quiz, you will check your understanding of how climate change affects ecosystems, what ecosystem tipping points are, and how cascading effects and nature-based solutions influence ecosystem resilience. You will read a series of statements and decide whether each one is true or false. Are you ready to become an Eco-Guardian? Let's begin!

Quiz content:

The quiz consists of **10 True / False statements**, based directly on the learning unit *ECOSYSTEM AT RISK: CLIMATE CHANGE IMPACT*. Each statement focuses on a key concept from the text and checks students' understanding of cause-and-effect relationships in ecosystems.

The quiz addresses the following themes:

- climate change as a global challenge,
- connections between ecosystems, the atmosphere, and oceans,
- the role of ecosystems in climate regulation,
- human activities as drivers of climate change,
- ecosystem tipping points and irreversible change,
- cascading effects within ecosystems,
- biodiversity loss and adaptation challenges,
- ecosystem resilience and nature-based solutions.

Students select **True** or **False** for each statement. After every response, they receive short explanatory feedback that supports learning and reflection.

Feedback approach:





After each statement, students receive immediate feedback:

- confirming correct understanding, or
- briefly explaining why the statement is incorrect and encouraging reconsideration.

This feedback is designed to clarify key concepts rather than simply indicate right or wrong answers.

ECOSYSTEM AT RISK: CLIMATE CHANGE IMPACT

Question 1 - Climate change affects both natural ecosystems and human systems across the world.

☒ True

Question 2 - Human activities such as burning fossil fuels and deforestation increase greenhouse gas emissions that trap heat and cause global warming.

☒ True

Question 3 - Exceeding 1.5°C of global warming increases the risk of ecosystem tipping points.

☒ True

Question 4 - Ecosystem tipping points usually lead to slow and easily reversible changes.

☒ False

Question 5 - When one part of an ecosystem is disturbed, only that species is affected.

☒ False

Question 6 - Climate change can reduce the stability and resilience of ecosystems.

☒ True

Question 7- Climate change has little effect on freshwater ecosystems.

☒ False





Question 8 - Ocean warming and acidification can threaten marine biodiversity.

✓ True

Question 9 - Climate change is the only pressure affecting ecosystems.

✗ False

Question 10 - Nature-based solutions help ecosystems become more resilient.

✓ True

Final message:

Mission complete!

By completing this quiz, you explored how climate change affects ecosystems, why some environmental changes can become irreversible, and how nature-based solutions can strengthen ecosystem resilience.

Remember:

🌱 Healthy ecosystems support biodiversity and human well-being.

🧑🌾 Nature-based solutions help protect both people and the environment.

🌍 Every action matters when responding to climate change.

You are now one step closer to being a true Eco-Guardian 🌿

If video

-

If audio

-

If 3D model

obj, .stl (optional if importing external 3D models, but Delightex library provides free assets).





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