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WP3- A3

Adaptation of the previous units to the new gamify



BIO4YOU
AR 2.0

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

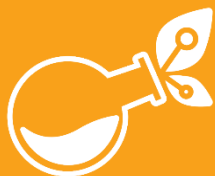
Project Number: KA220-BW-23-30-126516

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Introduction

The purpose of this document is to create guidelines to help the project staff that are dealing with school children, 14-19 aged, to create and re-adapt exercises using Augmented Reality technology.

To this end, a series of templates have been created that define exercises from a methodological, pedagogical and technological point of view.

A good written description, along with images, videos or sketches of the exercise is very important for experts to understand the idea. This will be part of the “General Information” template.

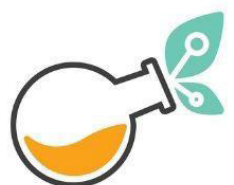
On the other hand, it will be important to define what STEM topic/subject each exercise is intended for and how AR technology can help students or staff or people interested in it when they use these exercises. In addition, people interested in the exercise can understand the usefulness of augmented information, and it will be necessary to explain the benefits.

During the process of defining the augmented information that each exercise will offer, staff working with teachers will be able to develop innovative ideas that make it easier to learn teaching concepts in an easier way.

All students will be able to view the contents explained by professionals projected in the real world in the form of text, 3D model, image, video, sound... This will help them focus their attention on exercise and more easily assimilate the associated concepts.

This document consists of the following points:

- Information about AR technology
- How to define AR exercise thanks to the template:
 - General information
 - Pedagogical specifications
 - Technical specifications





General information

In this part it will be necessary to report the generic information of the exercise so that it can be recognised.

Name of the exercise:	Global Change
Description of the exercises:	To explore how carbon emissions have changed throughout history, identifying the moments of greatest acceleration and understanding the impact of human activities.
Participants:	The exercise can be carried out both individually and in small groups of 2-3 students. The individual mode is ideal for independent and reflective use, while the group mode stimulates discussion and debate on historical eras and the causes of increased emissions. The group version is particularly useful if you want to encourage cooperative learning and teacher-led discussion, especially in the challenge phase.





Participants' age
range:

The exercise is designed for secondary school students. It requires: Basic knowledge of contemporary history and environmental science. Ability to explore and interact in digital environments. Recommended age: 12 – 16 years.

For children under 12 years old, supervision from a teacher or tutor may be useful.

STEM subject and
specific topic:

Earth Sciences and Environmental Education, including it in specific topics such as Climate Change, evolution of CO₂ emissions, anthropic impact on the atmosphere

Gamification
process:

To involve the students more and make the activity more memorable, a 'progressive and competitive' gamification is used, based on:

- Time challenge: complete the comparison between the eras in less than 30 seconds
- Motivational badge: unlock the title 'Carbon Archaeologist' for those who complete the mission
- Visible score: cumulative scoring system that can be used in a series of missions
- Option to include a class leaderboard or share results

The game motivates students to explore, think quickly and learn through play.

Written or graphic
description of
Augmented info:

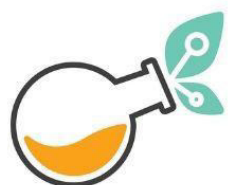
In this section it is necessary to describe what kind of Augmented info we would generate with the exercises. The description should be detailed in order to help to decide which technology is going to be used. In example: information overlay, virtual objects, animations,...

External (or extra)
tools required

A timer for the time and a leaderboard in the classroom for the scores.

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

<https://ourworldindata.org/co2-and-greenhouse-gas-emissions>



Pedagogical specifications

Here we will collect information on how to use the exercise in the learning session and the results and benefits of using it, from a pedagogical perspective.

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

With augmented reality, students don't just read about carbon emissions—they see the changes happening to the planet right in front of them.

Watching the Earth's atmosphere change over time makes learning more exciting and easier to understand.

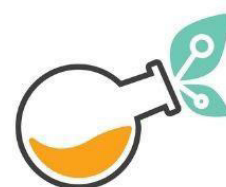
It brings science, technology, and storytelling together in a way that feels like a game, not a lesson.

Which pedagogical objectives are addressed through this scenario?

This activity helps students understand how human actions have changed the climate over time. It teaches them to read and compare data in a visual and interactive way. They also learn to think critically and work together when solving the challenge.

Which results are expected to be reached with its use?

Students will remember climate facts better because they experienced them in a fun, hands-on way. They'll feel more curious and confident when talking about climate change. In the end, they will better understand why carbon emissions matter—and what we can do about them.

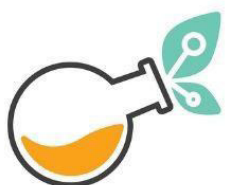




Which benefits are expected to be reached with its use?

Students become more engaged and motivated because learning feels like a game. They develop digital and visual thinking skills while exploring real-world climate issues.

Most importantly, they feel more connected to the topic and more empowered to make a difference.





Technical specifications

In this part it is necessary to specify whether the exercise was designed to be implemented with AR technology. This part is fundamental for the translation process. Please include text, audio text and all the necessary materials.

AR INFORMATION

Technology

Marker based - Assemlr world studio
<https://studio.assemlrworld.com/explore>

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

In this part the kind of marker or trigger will be selected, it could be a picture, a surface, a QR code...

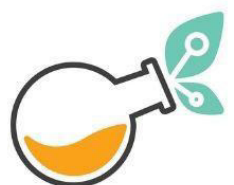
Hardware

Smartphone, tablet, camera.

and software
needed:

Type of Augmented
data

Text; 3D models used the software provider.





Written description of the AR data

In this AR-based activity, students explore how carbon emissions have changed over time by interacting with animated 3D globes from different historical periods.

They compare past and present data, observe the visual effects of rising CO₂, and take on a timed challenge to identify the biggest jump in emissions.

Through this playful and immersive experience, they learn key climate facts in a fun, engaging way.

If Image

-

If Text

Global challenge

Listen up

History up in smoke

Read more: According to reconstructions based on ice cores (especially from Greenland and Antarctica), the concentration of carbon dioxide was about 280 parts per million (ppm).

Read more: Industrial boom and increased use of fossil fuels — the rate of CO₂ growth has accelerated considerably.

Read more: Highest value in the last 800,000 years. Rapid increase, caused mainly by human activity (such as burning fossil fuels and deforestation), is contributing to global warming and climate change.

If video

-

If audio

‘Welcome, Traveller of the Future.

The world is calling you. Not in the future... but now.

From every corner of the planet, a signal rises into the air: an invisible alarm, made of smoke, heat and numbers.

Carbon emissions are not just data: they are scars on the face of





If 3D model

the Earth.'

'In this augmented simulation, your task is clear:

discover, decide, act.

You will go through missions

Every choice you make, every action you take, will change the fate of this virtual world... and maybe even the real one.'

'You will look to the past to understand what happened.

You will compare numbers and consequences.

You will experiment with strategies.

You will build a plan to save the future.

And, in the end, you will have to stand up for what you believe in.'

'But beware...

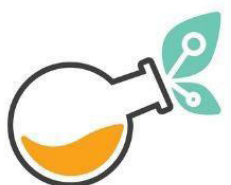
every choice has a price. Every action has an impact.

Are you ready to begin?'

The mission is about to begin.

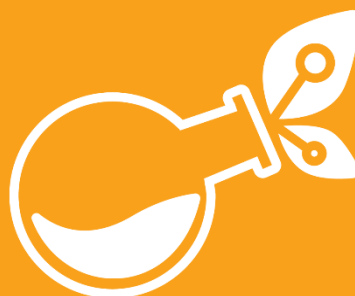
Touch the globe of the past and look... at how it all began.'

The format needed are: .glb.





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