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Augmented Reality Learning Guide with Tinkercad Integration

BIOS4YOU 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

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General information

Name of the exercise:	**Design Your Own Trophy with Tinkercad & AR**
Description of the exercises:	This exercise integrates **Tinkercad and Augmented Reality (AR)** to help students learn **3D modeling, spatial visualization, and AR-based interactive learning**. Students will create a 3D trophy in Tinkercad, preview export the model for 3D printing, and integrate it into an AR environment for visualization. **Objectives:** • Develop skills in **3D modeling using Tinkercad**. • Understand **solid and hollow masses**. • Learn **AR integration** by overlaying 3D objects in a real-world setting. • Engage students through a **gamified design challenge**.
Participants:	**Number of Participants:** Individual or Group (2-4 students per team). This task can be completed individually, but students are encouraged to share their AR visualizations with peers for feedback and inspiration.

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Participants' age range:	**Participants' Age Range:** • **Minimum Age:** 14 years • **Maximum Age:** 19 years
STEM subject and specific topic:	**STEM Field:** • Engineering, Computer Science, Mathematics **Specific Topic Addressed:** • **3D Modeling**: Creating digital prototypes • **Projections & Spatial Visualization**: Understanding front and side projections • **AR-based Learning**: Using **Augmented Reality overlays** to visualize 3D objects **Challenges Addressed:** • Enhancing engagement with interactive models • Improving spatial reasoning through AR • Making abstract concepts more tangible using digital overlays
Gamification process:	**Gamification Strategy:** • **Challenge-Based Learning**: Students participate in a "Best Trophy Design" contest. • **Points System**: Awards based on **creativity, precision, and AR interaction**. • **Leaderboard & Recognition**: Top designs are showcased in AR.
Written or graphic description of Augmented info:	Students will preview their completed model in Tinkercard AR viewer and they will upload their completed models to AR platforms and generate AR links to visualize and present their trophies. They will also scan QR codes to view sample designs. **Type of AR Data:** • **3D Models:** Designed in Tinkercad, exported as GLTF • **Text Overlays:** Interactive descriptions for each model

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	component • **Video Tutorials:** Embedded step-by-step guides for modeling & AR usage **AR Technology Used:** • Marker-based AR (QR codes linking to Tinkercad models) • Web-based AR platforms (8thWall, ZapWorks, or WebAR)
External (or extra) tools required	• **Hardware:** PC, Tablet, Smartphone, AR Headset (optional) • **Software:** Tinkercad, Web-based AR tool, 3D Viewer • **Materials:** 3D Printer (optional for physical output)
Links (video, images, text online and so on).	• **Tinkercad Tutorials:** www.tinkercad.com/learn • **AR Model Integration Guide:** [Example Link] • **3D Printing Preparation Video:** [Example Link]

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Pedagogical specifications

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

- AR enhances visualization, allowing students to view **3D models in a real-world setting**.
- Helps with **spatial reasoning**, improving understanding of object proportions and perspectives.
- Makes learning interactive and engaging with **real-time manipulation of digital objects**.

Which pedagogical objectives are addressed through this scenario?

- Develop **3D modeling and design thinking skills**.
- Foster **creativity through gamification**.
- Introduce students to **AR-based visualization techniques**.
- Encourage **collaborative problem-solving** through team-based activities.

Which results are expected to be reached with its use?

- **Increased engagement** with interactive 3D models.
- **Improved spatial reasoning** through hands-on AR applications.
- **Understanding of AR integration** for educational and industry use.
- **Enhanced creativity** by designing unique digital models.

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Which results are expected to be reached with its use?

AR enables students to see their virtual designs in real-world settings, improving their ability to assess and refine their projects before production.

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Technical specifications

AR INFORMATION

Technology	**Web-Based AR** (viewing models online).
If it's needed a marker, description of the marker	**Marker-Based AR** (QR code linked to Tinkercad models).
Hardware and software needed:	**Hardware:** PC, Tablet, Smartphone. **Software:** Tinkercad, Unity (optional), WebAR platform.
Type of Augmented data	• **Images** (.jpg, .png) – Used for model reference. • **Text** (descriptive overlays for model parts). • **Video** (embedded tutorials and walkthroughs). • **3D Models** (.GLB, .STL, .OBJ) – Used for printing and AR visualization.
Written description of the AR data	1. **Model Creation**: Students design a trophy in Tinkercad. https://youtu.be/0Fd3joJJl2M 2. **AR Integration**: Upload the 3D model to an AR platform.

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	3. **Interaction**: Users scan a QR code to view the model in real-world scale. 4. **Gamification**: Award points for detailed, accurate, and creative designs.
If Image	
If Text	
If video	Making Trophy in Tinkercad: https://youtu.be/0Fd3joJJl2M **Using the AR viewer in Tinkercad for iPad: https://youtu.be/jwmrle47FU0**
If audio	-
If 3D model	-

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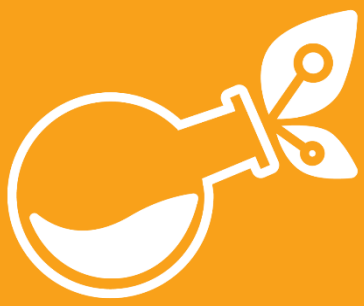

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