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Innovative Water Recycling and Conservation Techniques in Urban Planning



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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General information

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Name of the exercise:	Rainwater Harvesting AR App
Description of the exercises:	The <i>Rainwater Harvesting</i> AR exercise makes the study of water conservation and sustainable urban planning interactive and engaging. Students explore a virtual house, observing how rainwater is collected, stored, and reused in everyday spaces like the rooftop, kitchen, bathroom, and garden. Animations and visual overlays demonstrate the water flow, storage processes, and environmental benefits in real time. This combines Science (hydrology, environmental impact), Technology (AR tools), Engineering (designing water-efficient systems), Art (visualizing sustainable layouts), and Math (calculating water savings), providing a playful and meaningful STEAM learning experience.
Participants:	It can be conducted individually or in small groups (2–4 students) to encourage collaboration, discussion, and peer feedback while interacting with AR simulations of virtual representations of the materials.
Participants' age range:	14-18 Participants should have a basic understanding of environmental science concepts (e.g. harvesting, recycling, conservation techniques), along with fundamental literacy, numeracy, and ICT skills. They need access to a computer or tablet with internet connectivity and a willingness to engage with digital tools such as AR apps and Delightx. No prior coding or AR development experience is required.
STEM subject and specific topic:	STEM Subject: Bio-Architecture: Urban Ecosystem Integration Related Areas: Environmental Science, Biology, Geography, Digital Literacy/Computer Science, Art & Design, Social Studies (community action), Mathematics (data analysis in restoration), Language Arts (research, communication) Topic: Innovative Water Recycling and Conservation Techniques in Urban Planning
Gamification process:	- Rewards for Exploration: Students earn positive feedback for correct quiz answers and effective water-saving decisions.





Written or graphic description of Augmented info:	• 3D Models: Virtual representations of rainwater harvesting. • Information Overlays: Panels explaining recycling, harvesting, rainwater for toilets, rainwater for gardens etc. Animated Feedback: Visual cues indicate the impact of student decisions—correct or false answers give extra The App is designed for classroom tables or desks, allowing students to explore and design without needing to move physically through the space.
External (or extra) tools required	Students will need a mobile device or tablet with AR capabilities, along with an internet connection for the initial file loading. A printed AR marker sheet or a screen-displayed trigger image may also be used to activate the AR experience.
Links (video, images, text online and so on).	-

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?

The *Rainwater Harvesting* AR exercise makes the study of water conservation and sustainable urban planning interactive and engaging. Students explore a virtual house, observing how rainwater is collected, stored, and reused in everyday spaces like the rooftop, kitchen, bathroom, and garden. Animations and visual overlays demonstrate the water flow, storage processes, and environmental benefits in real time. This combines Science (hydrology, environmental impact), Technology (AR tools), Engineering (designing water-efficient systems), Art (visualizing sustainable layouts), and Math (calculating water savings), providing a playful and meaningful STEAM learning experience.

Which pedagogical objectives are addressed through this scenario?





Understand Water Conservation: Learn how simple actions and infrastructure can reduce water consumption and environmental footprint.

Develop Critical Thinking: Analyze water usage in different areas of the home and make decisions about optimal rainwater harvesting practices.

Encourage Collaboration: Work individually or in groups to discuss findings, share strategies, and provide feedback.

Foster Environmental Awareness: Experience the impact of sustainable water management in an immersive, visual way, promoting responsibility and curiosity.

The exercise helps students acquire knowledge about water conservation while also developing problem-solving, analytical, and collaborative skills rarely fostered through traditional lectures.

Which results are expected to be reached with its use?

Through the *Rainwater Harvesting* AR activity, students will understand how rainwater harvesting functions in practical scenarios and how it contributes to water savings and environmental sustainability. By interacting with animations and completing quizzes, students practice experimentation, reflection, and critical thinking. The exercise promotes both individual learning and collaborative exploration, as students discuss strategies, compare solutions, and reinforce their understanding of sustainable water practices.

Which benefits are expected to be reached with its use?

AR allows students to visualize water collection and reuse processes in an interactive and memorable way. The immersive environment increases engagement, motivation, and curiosity, while providing a safe space to explore and experiment with sustainable solutions. Students also develop communication and teamwork skills, making the learning process both practical and socially engaging. Overall, the activity fosters a positive connection to environmental responsibility and empowers students to apply STEM knowledge to real-world sustainability challenges.

Technical specifications





AR INFORMATION	
Technology	Augmented Reality
If it's needed a marker, description of the marker	QR code:  Share Code: RFV-DZP Share link: https://edu.delightex.com/RFV-DZP
Hardware and software needed:	Smartphone, tablet, laptop, PC
Type of Augmented data	3D models
Written description of the AR data	Students visualize 3D models such as virtual vegetation layers on buildings , observe real-time overlays (e.g., heat reduction, stormwater absorption), and explore ecological information boards.
If Image	-



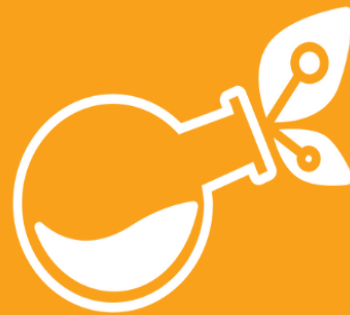


If Text	 Rainwater Harvesting  Rainwater harvesting is the process of collecting and storing rainwater that falls on rooftops, streets, or open spaces, instead of letting it go to waste. The water is stored in tanks, barrels, or underground reservoirs for later use. —  By capturing the rain, cities and homes can save millions of liters of water every year while reducing their environmental footprint. — Every drop counts! Many liters of clean water are wasted in kitchens every day. With a few simple habits, we can save water and protect the planet. ◆ Tips for Saving Water  Don't let taps run while washing dishes — fill a basin or use a bowl instead.  Soak, don't rinse — soak dirty pots instead of scrubbing under running water.  Check for leaks in faucets — even small drips waste liters over time!  Small actions in the kitchen can make a big difference for the environment.
If video	https://www.youtube.com/watch?v=KsL56UiTKk0&t=115s
If audio	-
If 3D model	The formats needed are:.obj,. stl.





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