A. Domain / Area / Subject

Science.

B. Topic

Physics

C. Age Group / Key Stage / Year / Background

High school

D. What is it about? / What's in your mind? / What's the matter?

This is about the effects of energy production on the environment, because of rising energy demand. Now the efforts to combat climate changes require a significant increase in low-carbon electricity generation.
The goal of this lesson is to raise the awareness regarding the environment. It is dedicated to improve the science literacy skill.

F. Overarching Narrative

The players are split in small groups in order to participate in a contest having to do some missions against time.
Environment: inside or outside the school, at home, in the parks,
Tasks: given across missions
Interaction: walking around, doing tasks through mini-games/challenges.
The lesson starts by studying the power plants for assessing the impact of energy production over the environment, followed by requiring students to participate in a competition where they will have some missions against time.
Mission A. Studying the power plants
Quest 1. After studying the types of power plants, students will receive 3 challenges:

- Drag It! - with the cursor different types of power plants (with specific icons) over the map of Romania - the game where students are provided with a map with missing elements. When the game starts, these elements start to drop from the activity header. Students will have to drag each element and drop it in the corresponding place, against time.
- Match it! - A game where students have to match text labels (components of a power plant) with images to win time and manage

to finish the activity.

- Millionaire Quiz - students will be provided with 10 -15 questions, with each category of questions being harder than the previous one, regarding the power plants.

Quest 2. At this level, the aim is to propose solutions for increasing low-carbon electricity generation. Students, organized in small groups, will prepare a presentation of this solutions. After presenting their solutions they will have again 3 challenges:

- Drag It! - with the cursor different types of power plants (with specific icons) over the map of Romania - the game where students are provided with a map with missing elements. When the game starts, these elements start to drop from the activity header. Students will have to drag each element and drop it in the corresponding place, against time.
- Match it! - A game where students have to match text labels (components of a power plant) with images to win time and manage to finish the activity.
- Millionaire Quiz - students will be provided with 10 -15 questions, with each category of questions being harder than the previous one, regarding the power plants.

What skills participants will develop? Skills/Competencies	What's the purpose? Aims/Objectives	How much time? Time	Who is taking part? Players/Participants	Where is the mission going to take place? Places of Interest	What is available for this mission? Tools/Resources	What evidence should participants provide? Evidence	How is achievement rewarded? Rewards/Incentives/Prizes

Communication/Expression • Advanced literacy • Content creation • Self expression • Creativity STEM • Reasoning • Inquiry • Tool Use • Logical/Spatial Thinking Social/Civic • Negotiation • Assertiveness • Respect • Integrity • Participation Autonomy/Initiative • Planning • Organisation • Management • Entrepreneurship **"Meta"** • Learning to learn • Design thinking • Critical thinking/appreciation • Digital literacy	Knowledge/Understanding • Analyse • Reflect • Solve • Document • Discuss • Evaluate • Interpret • Appreciate Action/Activity • Use • Share • Teach • Respond • Critique • Cooperate Creation • Publish • Develop • Design • Prototype	• x Hours • x Weeks • x Months • x Sessions	• Individuals • Small groups • Big groups • Whole class • Whole school • Parents • Peers • Professionals • Others	School • Classroom • Lab • ICT room • Schoolyard Home • Friends house Out & About • Park/Field • Museum/Zoo/Science centres/Galleries • City centre • Shops	Beaconing • Presentation • Online tools/Word processing • Online resources (video, newspapers) • Models • Databases • Game apps • Beacons • Mind-mapping Devices • Mobile phones/ Laptops/ Camera/Audio Recorder Teachers • Face-to-face • Lab tools • Pen & paper	• Photographs • Blog posts • Completion rates • Formulas • Graphs • Charts • Notes • Diaries • Spreadsheets • Presentations • Videos • Meeting notes • Quiz results • Feedback forms • Audio files • Demos • Prototypes	• Points • Currency/Money • Peer prestige • Vouchers • Cultural incentives • Customisation options
Mission A (Studying the power plants)		Brief overview of Quest 1 activities. At this starting level, the aim is to provide basic links between real world contexts and subject theory, while consolidating them into a shared ground.					

Students will assess the impact of energy production and will design solutions for increasing low-carbon electricity generation.
They will search the effects of energy production by using some websites and interactive material on their own laptops. After that they will make a presentation od their research. They will work in small groups.

Background

They have to know how electricity and energy is produced in powerplants. Students also know how to make a presentation or a short movie.

Skills

- Advanced Science and digital literacy
- Content creation
- Self expression
- Creativity
- Reasoning
- Inquiry
- Social/Civic
- Negotiation
- Assertiveness
- Respect
- Integrity
- Participation
- Planning

Quest 1

Studying the power plants for assessing the impact of energy production

Time Frame	Participants	Location(s)	Resources	Evidence	Rewards
2 hours in two sessions	• Individuals • Small groups • Big groups • Whole class • Parents • Peers • Professionals	School • Classroom • Lab • ICT room • Schoolyard Home • Friends house • Museum Science centres	Websites Interactive material Web-based software Short movies Laptops or tablets	Construction of the final product: movie or PowerPoint on the impact of energy production	Points

Quest 2

Propose solutions for increasing low-carbon electricity generation. Preparing a presentation of this solutions.

Brief overview of Quest 2 activities. At this level, the aim is to move outside the classroom, providing a first spatial expansion of learning activities while still keeping students in a controlled environment.

Time Frame	Participants	Location(s)	Resources	Evidence	Rewards
3 hours in 3 sessions	• Small groups • Whole class	School • Classroom • Lab • ICT room	Websites Interactive material Videos Laptops or tablets	The presentation of the final product: movie or PowerPoint	Points

• Organization • Management • Design thinking • Critical thinking/appreciation							

Lesson Path Assessment Criteria

Activity				*Value (percentage) of total item*	*Value (percentage) of Quest*	*Value (percentage) of Mission*	*Value (percentage) of total course*
Mission A	Studying the power plants					100%	100%
Quest 1	*Studying the power plants for assessing the impact of energy production*				100%	50%	
	Hydropower			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
	Power plants			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
	Nuclear power plants			100%	25%		

		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
	Other types of power plants			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
Quest 2	*Propose solutions for increasing low-carbon electricity generation. Preparing a presentation of this solutions.*				100%	50%	
	Hydropower			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
	Power plants			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			
	Nuclear power plants			100%	25%		
		Each item done correctly		100/number of items			

		Each item done incorrectly		25/number of items			
	Other types of power plants			100%	25%		
		Each item done correctly		100/number of items			
		Each item done incorrectly		25/number of items			