

*Creating an ECO online Natural Fit Virtual Programs to Prepare Students for
boosting 21st century Skills 4 the Future (UNITY)*

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*STE(A)M-focused PBL for transferring 2021st skills for fighting against
climate change*

LESSON PLAN 8: Water energy

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Lesson procedure:

Date:	__/__/__
Teaching staff:	Mr/Mss/Ms
Term:	2022-2023
Week:	1
Year Level:	Primary/low secondary
Time/length	Project day (one school day)
Key Learning Area:	Use of soft skills for climate change and blending interdisciplinary subjects, including science, math, art and social studies
Topic/focus:	Renewable energy sources
Lesson Name: Water energy	
Foreseen Outcomes:	
At the end of this lesson, students will be able to:	
<ul style="list-style-type: none"> ✓ define renewable energy sources ✓ define types of renewable energy sources ✓ define Hydropower ✓ describe different types of Hydropower ✓ describe ways how to use Hydropower ✓ design posters and poems, relevant to topic, ✓ improve their social skills, including group communication, interaction and discussion, improve their soft skills such as design thinking, critical thinking, decision making, efficient use of resources. 	
Lesson Description:	
This lesson shall demonstrate:	
<ul style="list-style-type: none"> ● What is renewable energy? ● What type of renewable energy sources exist? ● What is Hydropower? ● What type of Hydropower are there? ● What is a Hydro power plant? ● What affects Hydro power plants have on organisms living in water? ● How was Hydropower used in the past? 	
Prerequisites to this lesson plan (not applicable):	

Length (Lesson procedure):

This lesson is organized as a school project day and will take 6 hour, which also includes interdisciplinary learning.

Depending on how to implement the planned lesson, the teacher will need some ICT materials (computers, tablets, etc.) and other materials for the water mill. The teaching staff shall follow the following steps to implement the lesson successfully:

Step 1. Lead in:

Teacher greets the students, and asks them to think about renewable energy sources. After collecting the feedback from the students, the teacher asks for groping in accordance with the students' learning intelligence and or learning style. Here, teacher group students as:

- ✓ Group A: 2-3 students, having science learning interest/intelligence/capability/style
- ✓ Group B: 2-3 students, having technology learning interest/intelligence/capability/style.
- ✓ Group C: 2-3 students, having engineering (creativity) learning interest/intelligence/capability/style.
- ✓ Group D: 2-3 students, having art learning interest/intelligence/capability/style.
- ✓ Group E: 2-3 students, having math learning interest/intelligence/capability/style.

Note: As grouping the students, the number of students can change according to the class-size.

Lesson standard:

- ✓ The lesson is standardized around STEAM focused PBL for transferring 2021st skills for fighting against climate change. Here, we focus on understanding the importance of Hydropower and how to use it in everyday life.
- ✓ Through creating and performing, students will gain knowledge about how renewable energy sources are important for human existence.
- ✓ Regarding this, it can be expected that understanding of the topic will lead students to work on using more renewable energy sources in the future.

Common Core State Standards:

The teacher shall connect and correlate the lesson with the national syllabus and or program, which shall incorporate the lesson with the national curriculum.

Enduring Understandings:

The students will understand the core ideas and philosophy behind the Hydropower. Also they will find out what can be done for people to use more renewable energy sources. Students will understand their role of doing it in everyday life. The learning outcomes of the lesson shall be used by the students in their future life and incorporated in their local communities. Besides, the lesson is connected with following areas:

- ✓ soft skills development,
- ✓ interdisciplinary learning,
- ✓ blended/hybrid learning,

The lesson will also answer the following questions:

- ✓ Is the lesson transferable for skills development?
- ✓ Can it be teachable over and over again?
- ✓ Does it connect to real-life issues?

Essential Questions:

- What is renewable energy?
- What type of renewable energy sources exist?
- What is Hydropower?
- What type of Hydropower are there?
- What is a Hydro power plant?
- What affects Hydro power plants have on organisms living in water?
- How was Hydropower used in the past?

Before the lesson implementation, the teaching staff shall brainstorm the above questions with the colleagues at the same school.

Case section:

The teacher shall follow the following steps:

1. Teacher writes renewable energy sources on the board and reads it to the students. Then he/she asks them to think and tell them how important it is to use them.
2. Teacher asks students to brainstorm what would happen if we stop using them. Students can give their answers freely by raising their hand.

'Step 1. Lead in'. Each question is asked to the students who are grouped from A to E. Each group should have a tablet or a computer.

Questions for group A (Science-minded students):

- ✓ What are renewable energy sources?
- ✓ Name existing renewable energy sources.
- ✓ What are the most used ones in the world?
- ✓ What are the most used ones in your country and why?

Questions for group B (Technology-minded students):

- ✓ Research the term Hydropower.
- ✓ What types of Hydropower exist?
- ✓ What is Hydropower used for?

Questions for group C (Engineering-minded students):

- ✓ Research basic information about Hydro power plants.
- ✓ How does the water wheel work?
- ✓ What influence windmills had on organisms living in the water?
- ✓ What influence Power water plants have on organisms living in the water?

Questions for group D (Art-minded students):

- ✓ Can you design a poster and a slogan to promote Hydropower?
- ✓ Can you write poems about water?
- ✓ Research the internet and find music videos that have water in their title.

Questions for group E (Math-minded students):

- ✓ Research the internet and find 10 rivers that have the most Power water plants in the world.
- ✓ Use Excel charts to show collected data.
- ✓ Calculate the length of all rivers and show data in different length units of measurement.

When all groups are done each group presents their findings to the rest of the class. Students from other groups when each presentation is over are free to ask questions.

'Step 2. Make it real''

Students observe a model waterwheel to investigate the transformations of energy involved in turning the blades of a hydro-turbine. They work as engineers to create model water wheels while considering resources such as time and materials, in their designs. Students also discuss and explore the characteristics of hydropower plants. [Hydropower activity](#)

Skill focus:

During the lesson, Cognitive Skills, Decision Making, Problem solving, Creative Thinking and Interpersonal Skills will be the focus.

Content:

The content of the unit is based on the disciplinary or topic-area concepts.
Building Knowledge through learning by doing.

Assessments:

Describe the diagnostic, formative, and summative assessments employed in this lesson to gauge student learning.

Evidence of Student Learning:

Provide a list of the process documentation that you plan to acquire during the course of the lesson. These may include photographs of students engaged in learning, drafts of student work, quotes from students, interviews of students, video, etc.

Texts/Resources:

The collection of short and extended works aligned to the standards and content. Examples: materials for the workshop.

Learning Activities:

A series of tasks the student will engage in over the lesson. The activities are based on what students need to understand and be able to do for the performance and are aligned to the defined standards "Water energy" and the essential questions defined under **Case section**.

Practice:

Teacher will deeply explain the roles and importance of the environmental impact of using renewable energy sources. Here, the teacher shall elaborate or describe the lesson using these prompts provided.

The teachers shall create a flexible learning environment for the students. Here, the teacher uses:

Warm-up: ask about the questions and make the students ready for learning for the topic-specific subject.

Practice: The teacher sets-up demonstration/modeling (I do-we do-you do)
Studio/Rehearsal/Workshop (students engage in creating/planning/refining).

Clean-up: During the procedure, the teacher walks around the class and observes the students on what they need and control. If the students have questions, the teacher answers them.

Presentation of Work

Suggested Extensions:

Organize a trip to a nearby river or lake where students can take a boat ride. If possible take students on a rafting to experience the water power.