

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

*2021-1-SE01-KA220-SCH-000032448*

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

**LESSON PLAN 3: Building a Vertical Farm through STEAM focus PBL  
approach for fighting against climate change**

*Presented by Eurasia Team*

## Lesson procedure:

<b>Date:</b>	___/___/___
<b>Teaching staff:</b>	Mr/Mss/Ms
<b>Term:</b>	2022-2023
<b>Week:</b>	1
<b>Year Level:</b>	Primary/low secondary
<b>Time/length</b>	4-5 hour.
<b>Key Learning Area:</b>	Use of soft skills for climate change and blending interdisciplinary subjects, including science, maths, art and social studies
<b>Topic/focus:</b>	Build a Vertical Farming
<b>Lesson Name:</b> Use of waste textile for resource saving or efficient use of resources and transferring STEAM skills around PBL focus.	
<b>Foreseen Outcomes:</b>	
<p><i>At the end of this lesson, students will be able to:</i>  <i>Know what vertical farming is, what it is for,</i></p> <ul style="list-style-type: none"> <li>✓ Understand the reason why vertical farming is key for food production for climate change.</li> <li>✓ How to build a vertical farm through communication and cooperation (STEM focus PBL)</li> <li>✓ Understand on how to use vertical farms for the climate change.</li> <li>✓ 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.</li> </ul>	
<b>Lesson Description:</b>	
<p>This lesson shall demonstrate <i>what vertical farming is, what it is for,</i>  <b>How to use vertical farms for the climate change.</b>          Why vertical farming is key for food production for climate change.          Why building a Vertical farming is so important?</p>	
Pre-requisites to this lesson plan (not applicable):	
<b>Length (Lesson procedure):</b>	
This lesson will take 3-4 hour, which also includes interdisciplinary learning.	

Depending on how to implement the planned lesson, the teaching shall need some materials, including videos, comics and papers. The teaching staff shall follow the following steps to implement the lesson successfully:

### Step 1. Lead in:

Teacher greets the students, and asks what they know about the Vertical Farming. Ask students where their food comes from. (*farms*) Follow up by asking them to describe what they think a farm looks like. If needed, provide prompts to lead students to think about the need for open space, availability of water, adequate climate for plant growth, etc. Students will begin describing a traditional farm with acres of open space. After collecting the feedback from the students, the teacher asks for grouping 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 understand the reason why vertical farming is key for food production for climate change.
- ✓ How to built a vertical farm through communication and cooperation(STEM focus PBL)
- ✓ Understand on how to use vertical farms for the climate change.
- ✓ Regarding this, it can be expected that understanding the role of the importance of the vertical farming . As land runs out for farming and the need for crops increases, could vertical farming solve the problem?

### 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 national program.

### Enduring Understandings:

- ✓ The students will understand the core ideas and philosophy behind how to built a vertical farm through communication and cooperation(STEM focus PBL)
- ✓ Understand on how to use vertical farms for the climate change.

The learning outcomes of the lesson shall be used by the students in their future careers. 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 are the connections of Vertical Farming with STEAM skills?
- ✓ What are the connections of how to use vertical farms for the climate change with PBL?
- ✓ How does building a vertical farming lead to transfer soft skills?

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

### Case section:

The teacher shall follow the following steps:

1. Ask students where their food comes from. (*farms*) Follow up by asking them to describe what they think a farm looks like. If needed, provide prompts to lead students to think about the need for open space, availability of water, adequate climate for plant growth, etc. Most likely, students will begin describing a traditional farm with acres of open space.

Ask students if this type of farm land is abundantly available or if it is limited.

Explain to students that you are going to give them a list of criteria for a "Farm of the Future." Instruct them to think about each criteria as you read it and raise their hand IF they think it can be done.

- The farm can be located in any climate and still produce food year-round.
- The farm can be located in a large, urban city with very little open space.
- No soil is used for plant growth.
- The farm will use 95% less water than a traditional farm.

'Step 1. Lead in'. Each question is asked to the students who are grouped from A to E.

Questions for group A (Science-minded students):

- ✓ If you try to build vertical farming how would it be?
- ✓ Think about what you can do to contribute to vertical farming
- ✓ Where is the vertical farm located?
- ✓ Think about what other products could be recycled chemically?
- ✓ Would you choose to buy second-hand clothes? Why?

Questions for group B (Technology-minded students):

- ✓ How would you add technology in recycling old clothes?
- ✓ What alternative methods can you think of for recycling old clothes?
- ✓ What aspects technology would you use and or benefit in recycling used clothes.
- ✓ What technological design would you use, when you recycle textile?

Questions for group C (Engineering-minded students):

- ✓ How do you recycle textile? Which tools?

- ✓ What items can be recycled into textiles?
- ✓ Who would work with while recycling old clothes?

Questions for group D (Art-minded students):

- ✓ Can you design a poster for increasing the importance of environmental impact of textile waste and a result of massive consumption of clothing.
- ✓ Can you compose a song for sharing it?
- ✓ How can you design an advertisement for selling redesigned waste textile?
- ✓ What campaign would you run for increasing the use of recycled textile your local community?

Questions for group E (Math-minded students):

- ✓ What kind of measurement tools would you use to measure products made of recycled textile?
- ✓ How do you calculate its cost?

The teacher first, elicit the answers and then leads to the students take actions and leads to make sample designed, made of recycled textile goods. (Materials can be brought by the students from their homes.

#### 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: texts, works of art, word wall, etc.

#### 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 “**Use of waste textile for against climate change**” and the essential questions defined under “**Case section**”

#### Practice:

Teacher will deeply explain the the roles and importance of environmental impact of textile waste and a result of massive consumption of clothing 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:

Provide a bulleted list of potential next steps or subsequent learning activities that will extend the teaching and learning of arts content. Students could explore advanced topics in the area, research other artists and practitioners in the field, or develop either individual or group extensions, depending on the initial project.