

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

2021-1-SE01-KA220-SCH-000032448

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

LESSON PLAN 3:

Energy saving and MicroBit

*Presented by
Malmö Sweden*

Lesson procedure:



Date:	2022__/_09 / __15__
Teaching staff:	Mr/Miss/Ms
Term:	2022-2023
Week:	3
Year Level:	Primary/secondary
Time/length	2 hours
Key Learning Area:	<p>Understanding the effect and impact of saving energy by using programming and logical thinking skills in the area of climate change with the help of interdisciplinary subjects, including science, math, art and social studies.</p> <p>Use of soft skills for climate change and blending interdisciplinary subjects, including science, math, art and social studies</p>
Topic/focus:	Energy saving with Micro:bit
Lesson Name: Energy saving and Micro:bit	
Foreseen Outcomes:	
At the end of this lesson, students will be able to:	
<ul style="list-style-type: none"> ✓ understand the effect and impact of saving energy for every person in order to control food price, energy price and so on. ✓ Use of logic in programming to explain saving energy for climate change. Understand the basic and input functions as well as to use “logic” and “loop” as an introduction about programming with Micro:bit and use of programming in the society ✓ Improve their social skills, including group communication, interaction and discussion to be aware of Global Goals. 	
Lesson Description:	
<p>This lesson will be integrated into the science lesson to know about energy, different forms of energy. The lesson will start with group discussions of usefulness and impact of energy savings in the classrooms, at home, and in society. How saving energy helps the environment. How to use programming using different blocks to create the programs related to energy saving. Use if <i>statement</i>, changing true to false in micro:bit and see how the result is affected.</p>	
<p>Prerequisites to this lesson plan: Students need to have access to digital technology and a computer in the classroom. 2-3 pupils can work together to know the key words in English about environmental problems and what they mean.</p>	

Length (Lesson procedure):

This lesson will take 2 hours, which also includes interdisciplinary learning.

The teaching shall need digital devices to make students watch videos individually or all together about programming with Micro:bit, or film about energy and its different forms. The students need to have access to the internet for making the programs with micro bits. The teaching staff shall follow the following steps to implement the lesson successfully:

Step 1. Lead in:

The teacher starts the lesson with a short introduction from the previous lesson. Asks if students know the basic blocks of Micro:bit. saving energy. After a short introduction 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 understanding and taking against climate change. Here, we focus on programming and climate change, Goal 13. Through collaborative learning, the students will understand what are the main effects of climate change and what they can do as citizens to solve them. They will also be aware of the Goal 13 “Climate Action”.

Common Core State Standards:

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

Enduring Understandings:

The students will understand the device Micro:bit. The students will understand the importance and impact of saving energy. the lesson will be focused in following areas:

- ✓ Get basic knowledge of Block programming
- ✓ Java script and Python which is combined in Micro:bit
- ✓ Learn mathematics
- ✓ Increase logical thinking in order to solve Climate problems
- ✓ soft skills development,
- ✓ interdisciplinary learning,
- ✓ blended/hybrid learning,

The lesson will also answer the following questions:

- ✓ In which way programming helps the pupil to understand the energy saving and Climate Change
- ✓ How does logical thinking and coding help the pupils to get interested in Climate problems
- ✓ How to use programming in order to solve a problem in a collaborative environment
- ✓ How to combine different subjects in coding with Micro: bits

Essential Questions:

- ✓ What are the connections of the effects of climate change with STEAM skills?
- ✓ What are the connections of the effects of climate change with PBL?
- ✓ How can the study of the effects of climate change transfer soft skills?
- ✓

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 with the different groups of students

Step 1. The teacher repeat the basic blocks and ask the students to create programs in the following area

Diskussions

Solving the energy problem is the most important issue in every part of the world nowadays. How to achieve the Global Goals of climate change along with making essential energy sources to make sure about the access of energy for the basic needs. But at the same time discipline and learning about saving energy is equally important for each person in the society.

Questions for discussions to Group A: 2-3 students, having **s**cience

- ✓ Why is it important to use logic micro:bit ?
- ✓ How is logic used in scientific arguments? Why do we want to save energy?
- ✓ How to create a design template for an energy saving plan?

Questions for discussions to Group B: 2-3 students, having **t**echnology

- ✓ How programming could be useful construction using logic
- ✓ How does micro:bit to display an image using the LED screen, measuring temperature, measuring light level, measuring sound level
- ✓ How to use programming to benefit in saving energy?

Group D: 2-3 students, having **a**rt learning

- ✓ How to design a low energy light using logic
- ✓ How is using Micro:bit in art and design to compose a song about saving energy?

Questions for group E (Math-minded students):

- ✓ What kind of measurements would you use to discover how much energy is consumed?
- ✓ What calculation would you use?
- ✓ How do you calculate the extra cost of not saving energy?
- ✓ How to use Micro:bit in logic
- ✓ How to use Micro:bit in true / false and if statements

Skill focus:

During the lesson, Cognitive Skills, such as decision making, problem solving, creative thinking and interpersonal skills will be the focus.

Content:

Create a program using “Basic”, “Input “Loop” and “Logic”
Building knowledge on the effects of climate change through STEAM-focused PBL approach.

Assessments:

The teacher will use formative assessments during every lesson by giving feedback. Pupils will document every program stepwise in the form of a document or presentation. The pupils will help each other to improve individual skills in programming.

Evidence of Student Learning:

Students’ learning evidence will be the documentation of every program step by step

Texts/Resources:

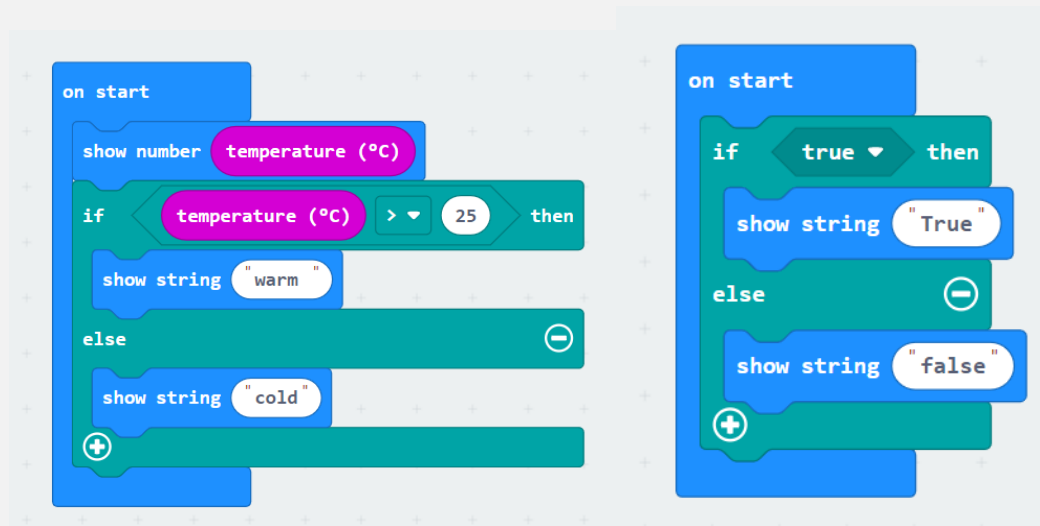
There are many examples in Micro:bit websites and there are many you tube films for constructions using microbots

Website: <https://makecode.microbit.org/> . [Open the website](#)

Learning Activities:

Create a program to show or explain or understand Global Goals using “Basic” and “Input” when the buttons are pressed, “loop” and logic. In the above two program it shows that if “true” show string “true” otherwise show “false”

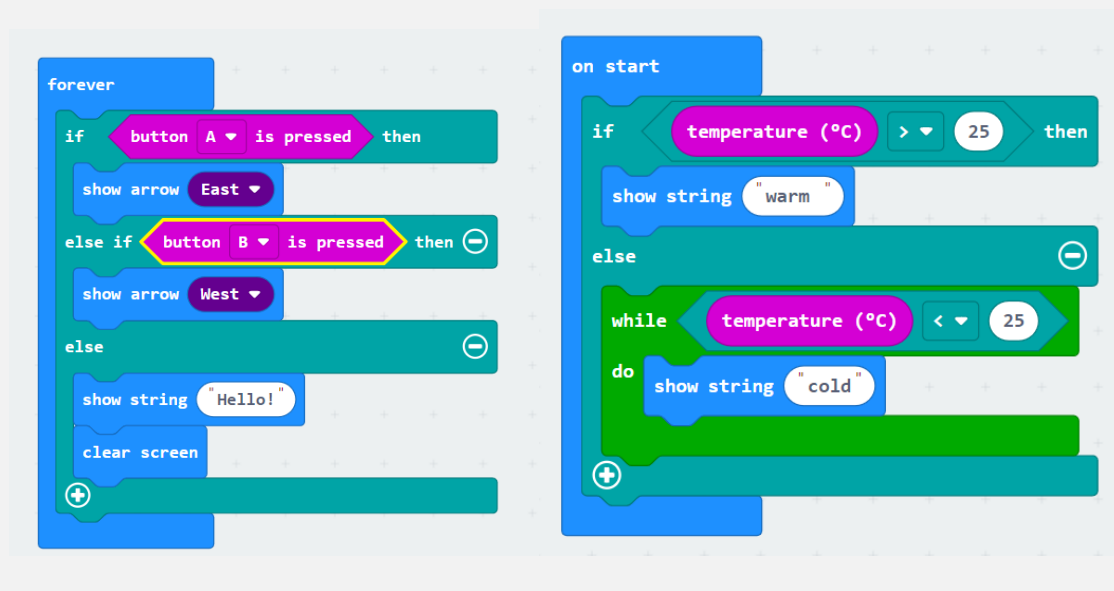
Create a program with logic when temperature is greater than 25 show warm, otherwise show cold.



Practice:

Here if - else statement should be used. If A is pressed, show a left arrow, otherwise if B is pressed, show a right arrow, and otherwise, clear the screen.

Create a program when button A is pressed show east , button B is pressed show arrow west



Suggested Extensions:

- ✓ Explore logic, basic blocks, input and loop create different program
- ✓ Create a new program using “Basic”, “Input “Loop” and “Logic”
- ✓ Related to your project . Add another case (by clicking the + sign). There you must enter something that happens when both buttons are pressed.
- ✓ Energy saving and micro:bit : make simple constructions by using the logic below.

