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Let’s make a light timer

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Project Information

PROJECT: CliC-PoliT

PROJECT TITLE: Engaging students and the society in environmental and climate change activities to raise awareness and strengthen responsible citizenship.

ACRONYM: Climate Action and Light Pollution Threat

PROJECT WEBSITE: https://www.clicpolit.eu/

PROJECT NO.: 2021-1-IE01-KA220-SCH-000027825

PROJECT COORDINATOR: CIT Blackrock Castle Observatory, Cork, Ireland

Project Partners

BLACKROCK CASTLE OBSERVATORY
The Space For Science

NUCLIO
Núcleo Interativo de Astronomia e Inovação em Educação

FTP - Europlanet gUG

ΑΙΕΝ ΑΡΙΣΤΕΥΕΙΝ
ELLINOGERMANIKI AGOGI

WROHellas
ΟΡΓΑΝΙΣΜΟΣ ΕΚΠΑΙΔΕΥΤΙΚΗΣ ΡΟΜΠΟΤΙΚΗΣ & ΕΠΙΣΤΗΜΗΣ

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Let's make a light timer	
Topic Title: Light Pollution	
Lesson Plan Title: Light timer	
Duration: 90 minutes	
Short Description of the Lesson	Students will gain an understanding of programming and calibrating their micro:bit light timers and place them in their chosen locations to record energy use data.
Learning Goals	• To calibrate and deploy a data logger (micro:bit light timer) • To collect environmental data (light usage) over time
Green Competences Linked	• Gain an understanding of the Sustainable Global Goal 13 (climate action), the importance and why it's relevant to us • Understanding the importance and the impact of our energy usage on climate change. To consider, plan and monitor our energy use at home or at school and understand how awareness can drive changes in behaviour
Target Group	Primary school students aged 10-12 years old High school students aged 12-14 years old
Educational Approach	Inquiry based learning Project based learning
Link to School Curricula (if applicable)	Physics, Electricity, Robotics, Technology
Facility/ Equipment	• Classroom • Internet access • Micro:bit • Micro:bit battery packs
Tools/ Materials	• Lesson slides • Lesson plan • student work from previous lesson
Main Tasks	**Task 1: Introduction** **Task 2: Make and test the light timer** **Task 3: Collect data** **Task 4: Review**
Extracurricular Activities	Ideas for extracurricular activities at the end.

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ANNEXES

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Introduction

Recap the calibration readings gathered in the last lesson for each area you're going to monitor. What did students decide about which locations might allow reliable collection of data and why?

Make and test a micro:bit light timer

Introduce the energy light timer project in MakeCode blocks

Explain students will need to use the data gathered in the last lesson to calibrate the timer for their chosen locations. Specifically they will use the data from the previous lesson about the readings for light in their chosen location, when lights are on and off.

Follow the steps below:

1. Put the value of the light reading from the previous lesson into the code where the LIGHT variable is set, replacing the number 100.

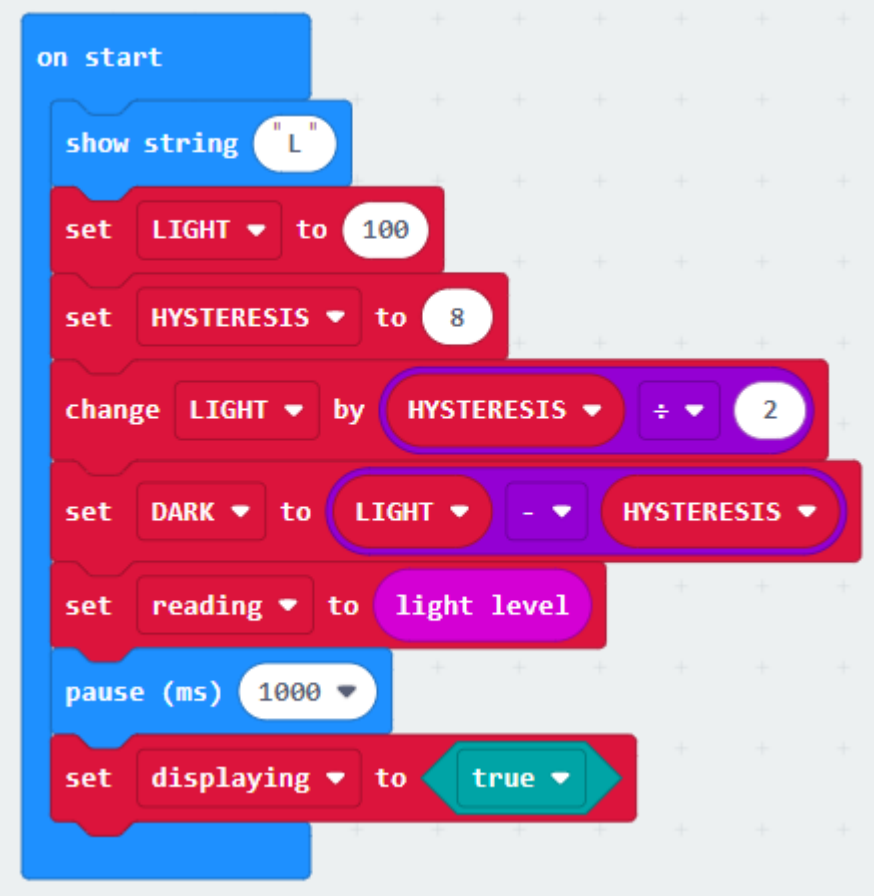

Figure 1: Replace the number 100 from the LIGHT variable and put your reading value

2. Download the program from the PC, remove USB and attach a battery pack.
3. Place your micro:bit under the light you want to monitor how much time is on.

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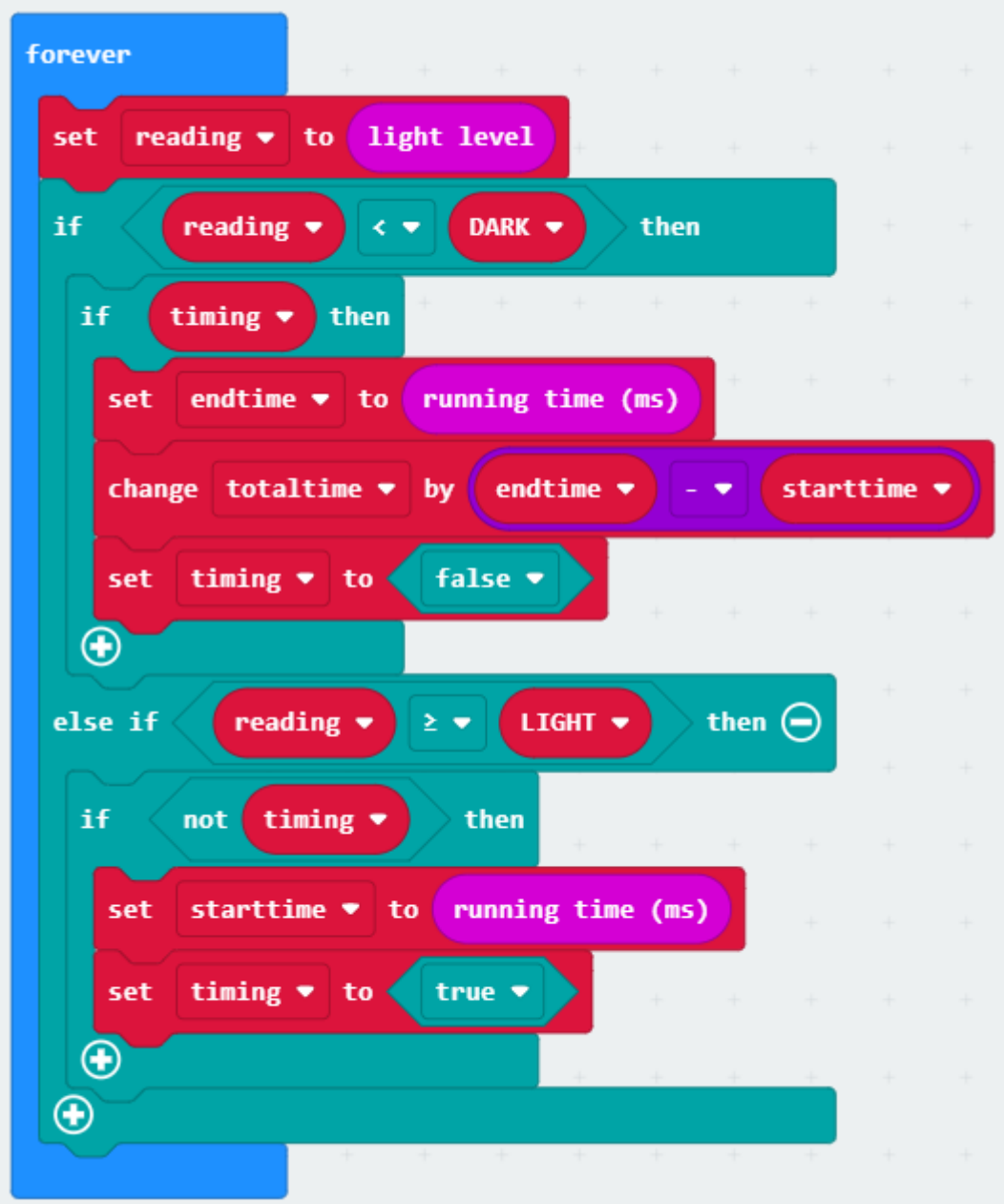

Figure 2: *Place your micro:bit under the light you want to monitor how much time is on*

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4. When the lights are off, will appear a dot on the display. When the lights are on, the display lights up. You should see a dot on the display when the light is off, and the display lights up when your light is on.

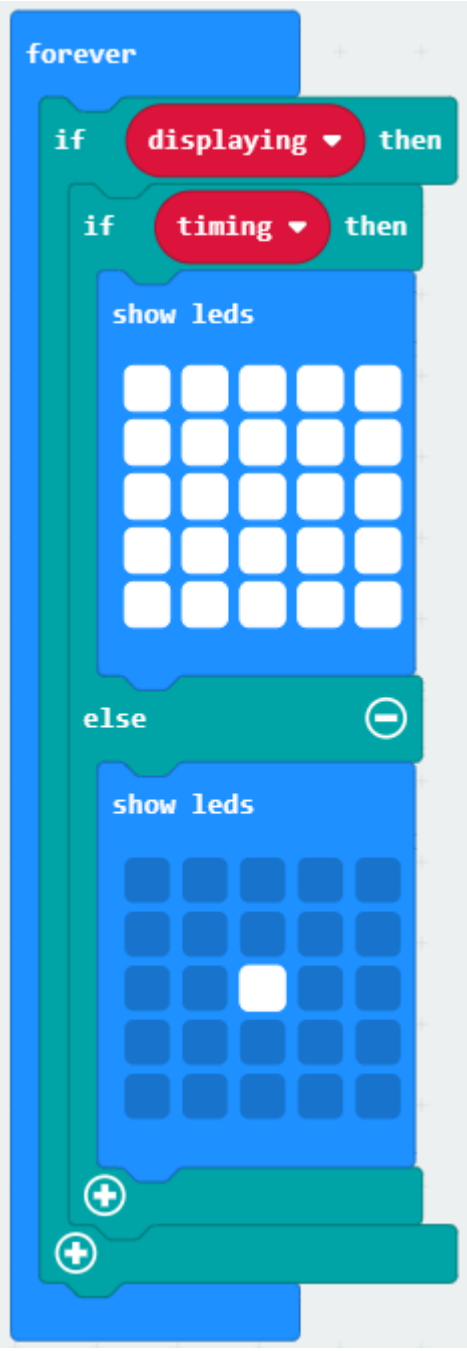

Figure 3:Program the micro:bit to display a different combination on led lights, when your light is on or off

5. The micro:bit will keep timing. When you press button B it will show how long in minutes the lights are on.

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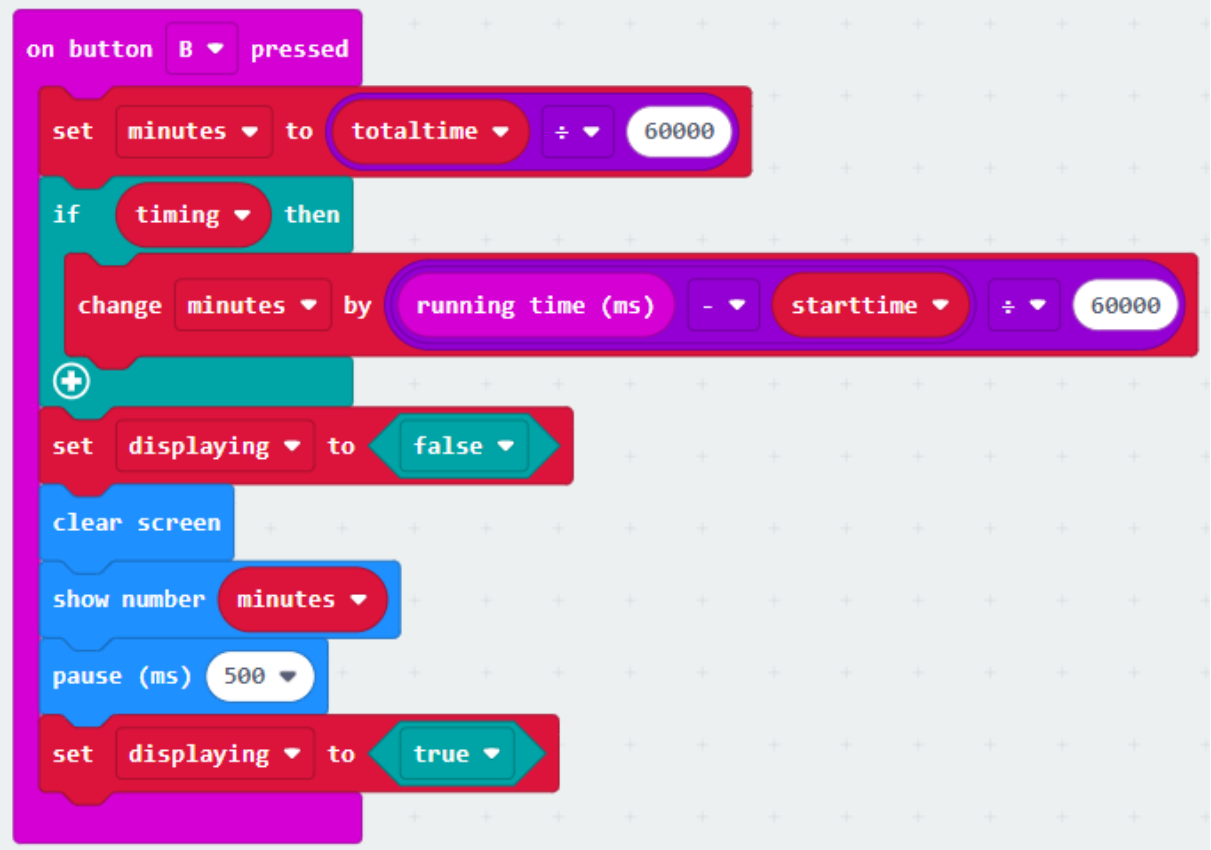

Figure 4: When you press button B it will be shown to the display how long in minutes the lights are on.

6. You may wish to assign different locations to students for this testing process.

Collect data

- Reset the time variable by pressing the reset button on the back of the micro:bit(s).
- Place them in their chosen locations and leave them for an agreed longer period of time, e.g. over a day, overnight or even over a weekend.
- Once the time has lapsed, retrieve the light timers and gather the data

Day	Time in minutes
Monday	510
Tuesday	520
Wednesday	504
Thursday	982
Friday	540

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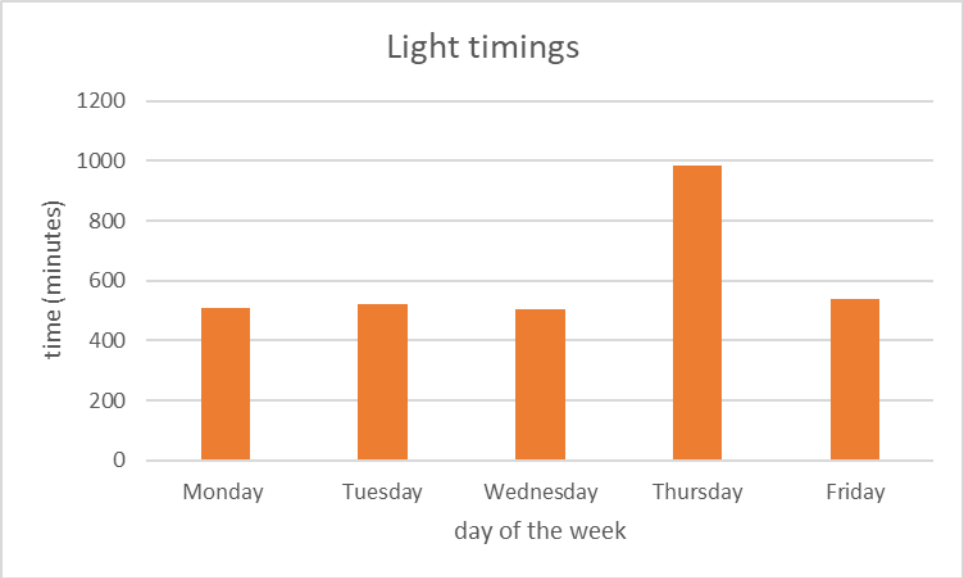

Review

Invite students to recap to each other what they modified in the code and why.

Ask them to share any issues they had in the testing stage and how they overcame them.

Discuss what students expect to discover from the data.

If you wish, review the learning objectives

Differentiation

- Students could explore the role played by the hysteresis variable which makes sure the timer is only turned on or off.
- Students could use Python instead of MakeCode blocks

Opportunities for assessment

Informal assessment of students

- Was the code modified to match the data recorded in the previous lesson effectively?
- Was the code flashed on to the micro:bits successfully and any problems worked through systematically?
- Were the micro:bits deployed in the correct locations successfully?
- Were students able to explain what they modified and why and what they expect to discover from their data collection?

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