Lesson plan: Session 5

Light

Overview

In this session learners will program the micro:bit as a compass and expand it by adding to the number of directional readings. Then through an introduction to the micro:bit classroom, learners will learn more about Goal 9 'Industry, Innovation, and Infrastructure' by coding the micro:bit light sensor and designing a smart streetlight.
60 minutes

Learning Outcomes
- Investigate SDG11 Sustainable Cities and Communities
- Code and remix code to use a m:b as a compass
- Develop a deeper understanding of how the m:b light sensor works by creating a smart street light
- Remix these skills and apply their knowledge to solve other situational problems

Disciplines
- Computer Science, Science, Mathematics, Social Studies/Geography

Transferable skills
- Critical Thinking
- Communication
- Collaboration
- Creative Thinking
- Computational Thinking
- Design Thinking.

Resources

- CodingChange_S5_teacher PowerPoint
- m:b, one battery pack
- rgb led
- 4 alligator clips

Activities

Minds On – Compass

- Slide 4 – Video of m:b mask reminder
- Slide 5 – introduction of SDG 11 Sustainable Cities and Communities. Start with a discussion around either the city image or the infographic – or both! What do you notice? What do you wonder? Are always a good go to.
- Slide 6 lesson goals
- Slides 7-14 – micro:bit compass
  - Slide 9 1:38 minute video explaining the magnometer on the micro:bit
  - Slides 10 – 12 – teachers can determine the best way to roll out the coding of the compass to meet the needs of their students. They may wish to spend some time determining what numbers should be used in the code and depending upon the number of directions you wish to show.
  - Slide 13 highlights code used in this project and 14 asks for possible remixes.
  - Take time to explore your playground by setting up some sort of orienteering challenge, better yet – have your students design it! Level up by including some "step counting".

Action – Smart Street Light

- Slides 15 – 20
  - Slide 15 – 5:16 minute video explaining how m:b leds can emit light as well as determine a light level
  - Slide 16 – diagram to show how to connect the m:b to the RGB LED
  - Slide 17 – describes how to set up the Micro:bit Classroom and gives the initial code to turn on and off the LED using the light sensor set at a certain level.
  - Slide 18 outlines the Smart street light design challenge around using the initial code and the starter colour code. Teachers may wish to spend more time exploring the colour possibilities and diving into colour theory using slide 19 as a

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place to start the investigation. There's a ton of math here as well as proportional reasoning is involved in converting a number out of 255 (HEX code) to a number out of 1023 (Binary Code(for the RGB LED code.

Reflect and Extend
- Teachers may wish to extend the lesson with the materials offered here
  https://microbit.org/lessons/
    - Extend the design challenge by scrolling down the page to Nightly safety
    - Dive into more art ideas with the Nature art unit