Lesson plan: Session 3

Greenhouse Effect

Overview

In this session learners will explore greenhouse effect, relating it to SDG 13 Climate Change. They will use the micro:bit accelerometer to measure, record and broadcast data about wind speed and use the micro:bit thermometer to learn about greenhouse effect.
60 minutes

Learning Outcomes
- Connect Greenhouse Effect to UN SDG 13 Climate Action
- Code and build a wind monitor
- Deepen understanding of greenhouse effect through:
    o Coding and creating a temperature monitoring system
    o Conduct an experiment to understand greenhouse effect
- 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_S3_teacher powerpoint
- m:b x2 for broadcasting and at least one battery pack
- craft materials for wind monitoring station
    - 2 large popsicle sticks
    - 1 set of round ends cut off
    - small hole drilled in the remaining rounded ends
    - 1 dowels – 1 @ 24cm
    - 1 @ 17cm x 14cm piece of craft board
    - 1 @ 2 x12x20 cm piece of wood
    - 2 pop bottle caps
    - Scissors, masking and duct tape
    - Glue gun

Activities
Minds On – Wind Monitoring Station

- Slide 2 –Greta Thunberg quote – Teachers may wish to use this slide in as a springboard for discussion around:
    - living conditions on our earth
    - youth activism and how students can get involve and have their voices heard
    - environmental issues in their own region they are noticing and wondering about and how they could be addressing
- Wind Monitoring Station
    - Slide 6 outlines the materials needed and suggested sizes to create the station. Teachers may need to alter the actual materials to reflect the materials they have available.
    - Slide 7 provides and image of the system when it's built and set up with the m:b
    - Slide 8 outlines the code. Teachers may wish to scaffold the coding by offering students some partial code and hints using comments. We are using the m:bs ability to read pitch to record the wind blowing on the station. The greater the pitch, the stronger the wind.
    - Slide 9 – videos of the system and the data collection
    - Slide 10 – the data explained
    - Slide 11 reviews the coding aspects covered in this project

Action – Greenhouse Effect

- Slide 12/13 – introductory video to greenhouse effect. Teachers may wish to extend this explanation with student research.
- Slides 14 – 19 show a scaffolding of code which Teachers can use to best meet the needs of their students. By this time it may be sufficient to have students explore coding options of their own by giving goals instead of giving the actual code. Recall a good scaffold is to provide some partial code and have students complete or remix it.
  - How could we record temperature using the micro:bit?
  - How might we plot our temperature data using the m:b? and so on
  - Slide 16 explains the data collection steps
  - Slide 19 reviews the coding aspects covered in this project if teachers implement all the suggested scaffolds
- Slide 20 reviews the greenhouse effect experiment around using shades to keep the sun out. Teachers may wish to input their own ideas here for investigation

Reflect and Extend

- Teachers may wish to lead students in a brainstorming session around greenhouse effect and why it's an important issue and how we can fight both making it worse as well as dealing with it.
- Further projects to explore our environment can be found at https://microbit.org/news/2020-07-06/make-a-microbit-weather-station/ and include
  - Precipitation monitor (end of wind monitoring video)
  - Sunlight sensor (we'll be exploring versions of this in other sessions)
  - Thermometer
  - Compass (we'll be diving in with this in another session)
  - Max-min thermometer
  - Indoor-outdoor thermometer
  - Max-min temperature logger