Global Challenge

Night Sensor

Lesson 2
What are the main challenges around road safety for children at night?

What was your favourite technology device idea from last lesson and why?
Your challenge:

- create a **Night Sensor:**
  - a wearable device that will give an audio and visual reminder to a child to ‘be safe, be seen!’ at night.
Decomposition

- breaking down a complex problem into smaller, component parts.

Algorithm

- a sequence of instructions or rules to solve a problem
- written for a person to follow to write code
Learning objectives:

- To decompose a large problem into smaller, component parts
- To write a detailed, accurate algorithm using pseudocode and flowcharts
- To include iteration, loops and selection in algorithms
- To test and debug algorithms and understand why this is important
Your challenge:

- create a **Night Sensor**:
  - a wearable device that will give an audio and visual reminder to a child to ‘be safe, be seen!’ at night.
Night sensor basic algorithm

- Start
- Sense if dark
  - If dark then
    - Make audio sound
    - Display visual message
    - Stop
  - Otherwise, repeat
Pseudocode

● A simple way of describing a set of instructions (an algorithm)
● No specific syntax (programming language)
Night sensor pseudocode algorithm 1

- **START**
- **INPUT** sense darkness level
  - **IF** dark then
    - **OUTPUT** musical audio for 5 seconds
    - **OUTPUT** visual display ‘Be safe, be seen!’
    - **STOP**
  - **ELSE**, **REPEAT**
  - **ELSE** **REPEAT**
Night sensor pseudocode algorithm 2

- When START button pressed
  - OUTPUT ‘on’ audio sound
  - INPUT Sense IF dark
    - IF dark then
      - OUTPUT musical audio sound for 5 seconds
      - OUTPUT visual display ‘Be safe, be seen!’
    - ELSE, do nothing
- When stop button pressed
  - OUTPUT ‘off’ sound
  - STOP
Input device
• hardware that sends data to a computer system

Output device
• hardware that communicates the results of processed data from a computer system to the outside world
Iteration
● The repetition of a sequence

Loops
● A form of iteration
  ○ repeat until a certain condition is met

Selection
● a decision to be made according to whether a condition is met
  ○ If, then, else
Flowchart symbols

- Start / Stop
- Input / Output
- Process
- Decision

Direction of flow
Night sensor flowchart

- **START**
- **INPUT sense darkness level**
  - IF dark then
    - OUTPUT musical audio for 5 seconds
    - OUTPUT visual display ‘Be safe, be seen!’
    - STOP
  - ELSE, REPEAT
Wrap up questions:

● How have you used decomposition today?
● Why have we spent time designing algorithms today before starting to code?
● How have you used iteration and loops today?
● How have you used selection today?
● How will pseudocode and/or flowcharts help you code?
● Why has it been helpful to test and revise the algorithms today?
Learning objectives:

- To decompose a large problem into smaller, component parts
- To write a detailed, accurate algorithm using pseudocode and flowcharts
- To include iteration, loops and selection in algorithms
- To test and debug algorithms and understand why this is important