Medium Term Plan: Supporting Implementation of LTP/Progression Grid

Subject: Computing – Sensing and Spreadsheets Year: A – Phase 3 – Unit 4/4

NC/PoS:
- Design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems.
- Work with variables and various forms of input and output.
- Solve problems by decomposing them into smaller parts.
- Select, use, and combine a variety of software on a range of digital devices to design and create content that collects, analyses, evaluates and presents data.
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

Prior Learning (what pupils already know and can do)
- Understanding of programming constructs: sequence, repetition, and selection.
- Basic understanding of variables from "Variables in Games".
- Experience collecting and organising data using tally charts or pictograms.
- Introduction to physical computing using inputs and outputs.

End Points (what pupils MUST know and remember)
- Design and implement a program that uses sensing inputs from a micro:bit.
- Understand how to create, use, and debug code including selection and variables.
- Collect real-world data using sensors, export it, and analyse it using spreadsheet software.
- Use formulas and charts in spreadsheets to interpret data and answer questions.

Key Vocabulary
micro:bit, sensor, variable, input, output, sequence, selection, spreadsheet, cell, row, column, formula, graph, data logger, analyse

Recommended Resources:
- Hardware: micro:bit, laptops/tablets.
- Software: makecode.microbit.org, Google Sheets
- Other: Design templates, printed planning sheets, data analysis worksheets.

Unplugged activities provide possible opportunities for the children to record.

Curriculum Connections:
- Science: Investigating environmental data such as temperature or light.
- Maths: Using data to calculate averages, differences, and draw graphs.
- DT: Understanding design processes involving real-world systems.

Career Opportunities:
- Data Scientist: Using spreadsheets and sensors to interpret trends.
- Product Designer: Creating devices with embedded sensing technology.
- Software Engineer: Writing programs for physical systems.
- Environmental Researcher: Using data from the real world to monitor changes.

Session 1: Introduction to the micro:bit and Data Collection

Objective: To understand how a micro:bit can collect real-world data using sensors.
Digital Activity: Pupils write a simple program to use the micro:bit's light or temperature sensor.
Unplugged Activity: Explore the concept of inputs, outputs, and data points.

Key Vocabulary: sensor, input, micro:bit, variable, data point

Session 2: Recording Data with a micro:bit

Objective: To log and collect data over time.
Digital Activity: Pupils program a micro:bit to collect and store light/sound/temperature readings at intervals.
Unplugged Activity: Predict and sketch where highest/lowest readings might occur.

Key Vocabulary: data logger, interval, environment, collect
Session 3: Exporting and Organising Data in a Spreadsheet Objective: To organise exported sensor data using a spreadsheet. Digital Activity: Open CSV files from micro:bit logs in Google Sheets or Excel and identify rows, columns, and cell values. Unplugged Activity: Manual sorting and grouping of mock data. Key Vocabulary: spreadsheet, row, column, cell, CSV
Session 4: Analysing Sensor Data Objective: To use formulas and charts to analyse collected data. Digital Activity: Use formulas (SUM, AVERAGE) to analyse light or temperature data and generate bar or line graphs. Unplugged Activity: Plot graphs manually on grid paper and compare trends. Key Vocabulary: analyse, chart, average, total, graph
Session 5: Designing a Step Counter Project Objective: To plan a project that combines inputs, outputs, and variables. Digital Activity: Pupils design an algorithm and flowchart for a micro:bit-based step counter. Unplugged Activity: Annotate and explain their designs to a partner. Key Vocabulary: design, flowchart, algorithm, program flow
Session 6: Building and Testing the Step Counter Objective: To implement and debug a working program using prior designs. Digital Activity: Create and debug a working step counter using micro:bit's accelerometer and variables. Unplugged Activity: Review test results and match them to expected design outcomes. Key Vocabulary: debug, accelerometer, implement, refine
Session 7: Interpreting Step Data and Presenting Findings Objective: To collect step data and evaluate patterns using a spreadsheet. Digital Activity: Pupils gather real-time step data, input into a spreadsheet, and use charts to display activity trends. Unplugged Activity: Prepare a short report comparing step counts at different times of day or pupil groups. Key Vocabulary: compare, pattern, evaluate, presentation
Future learning this content supports: - Real-time data systems and control using microcontrollers (e.g., Crumble, Arduino). - Statistical data handling in upper phase 3 and KS3 mathematics. - Physical computing for real-world problem-solving projects in STEM contexts.