Beech Hill Primary School Knowledge Organiser

Topic: Computing – Computer Science	Year group	Term
Discovery Coding: Speed direction and coordinates; and Random numbers and simulations.	Year 5	Autumn 2 6 sessions

Background knowledge

Children will have completed two units of Espresso Coding in Year 4, Introduction to variables and Repetition and loops.

What should I already know?

Children know how computers use variables to count things and keep track of what is going on. They can create simple games which use a score variable. Children know how computers use repetition and loops to do things over and over again. They can design their own apps including variables.

National Curriculum Objectives / Key Skills	The Journey
Pupils should be taught to: To design, write and debug programs using if, then, else statements and with guidance begin to program simple hardware. To use sequence, selection, and repetition in programs; work with variables. To use logical reasoning to explain how some simple algorithms work and to begin to detect and correct errors independently. **Links to CAS progression pathways** *Programming and development* • Executes, checks and changes programs. • Understands that programs execute by following precise instructions.	1. To set values in code to control the speed of an object. (Faster and slower) 2. To use object properties (speed, heading and angle) to create a driving simulation. (Speedy Simulation) 3. To create a sailing game where a boat's position on the screen is controlled by making changes to its co-ordinates. (Sailing the Seas) 4. To be able to generate and display random numbers, and use these within the program for a car racing game. (Racing at random) 5. To create a ping-pong game, using random headings in specific ranges. (Ping Pong) 6. To use random numbers in combination with variables and conditional hit events to create a realistic pinball game. (Pinball)

• Understands what an algorithm is and is able to express simple linear (non-branching) algorithms symbolically. • Detects and corrects errors, i.e. debugging in algorithms. • Designs simple algorithms using loops and selection, i.e. if statements. • Designs solutions (algorithms) that use repetition and two-way selection, i.e. if, then, and else • Uses diagrams to express solutions. **Links to Curriculum for Excellence** • I understand that sequences of instructions are used to control computing technology. • I can develop a sequence of instructions and run them using programmable devices or equivalent.	

Outcomes
An overview of what children will know / can do Working towards: Children know how computers use numbers to represent things such as how fast things are moving, and where they are. Children know how computers can generate random numbers and how these can be used in simulations. They will show some awareness of the difference between set blocks and change blocks. They will begin to use coordinates. Expected: Children know how computers use numbers to represent things such as how fast things are moving, and where they are. Children know how computers can generate random numbers and how these can be used in simulations. They use this knowledge to create their own games showing their awareness of the difference between set speed and set heading and variables like change speed and change heading. They will use coordinates to return objects to a starting position. Exceeding: Children know how computers use numbers to represent things such as how fast things are moving, and where they are. Children know how computers can generate random numbers and how these can be used in simulations. They use this knowledge to create their own games, effectively applying blocks correctly to show the difference between set speed and set heading

and variables like change speed and change heading. They will show their understanding of coordinates by independently using them to position objects in their games.

Key Vocabulary

1. object, action, speed, property, value, accelerate, decelerate, debug
2. angle, speed, heading, value, iteratively, object properties, simulation
3. decomposition, angle, co-ordinates, condition, negative numbers, y-axis, x-axis, position
4. variable, generate, random, simulate, x-axis
5. random number, range, degrees, event, condition, heading, hit
6. random number, angle, heading, variable, degrees, condition, position

Key people / places

Allan Alcorn created Pong in 1972 for Atari. With Larry Emmons, Alcorn made the first computer driving game in 1974, Gran Trak 10, again, for Atari. He hired future Apple boss Steve Jobs to work for Atari.

Question of the week.

1. How do we make the car go faster/slower? How might we make the car go backwards?
2. Which part of the code controls the way the car steers?
3. What should happen when the boat hits the rocks? What should happen when the boat hits a wave?
4. How do random numbers make the game more interesting?
5. How did you change your values (numbers) after you tested them in the Ping Pong game?
6. What skills, that you already knew, did you use to make the pinball game?