



Southdale
C of E Junior school
Shining like stars in the universe

Computer Science Progression



SEQUENCE AND ANIMATION

Learn to make things happen in a sequence, creating simple animations and simulations.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Stepping through Space	To write a computer program where different pieces of code execute in a particular sequence	<i>sequence, run, before, after, between, execute, algorithm</i>
Snail vs spider	To create a program that uses sequences for two different objects moving on the screen	<i>sequence, order, before, after, between, action, algorithm, execute</i>
Alien space race	To write code that uses a timer to create a sequence of events	<i>timer event, sequence, run, before, after, execute, algorithm, debug</i>
Traffic Lights	To write code that uses a timer to create a sequence of traffic lights turning on and of	<i>timer event, sequence, before, after, execute, algorithm</i>



CONDITIONAL EVENTS (SELECTION)

Learn to code with 'if statements', which select different pieces of code to execute depending on what happens to other objects.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Space maze	To use 'hit events' to program a space maze game in which an object reacts to particular conditions.	<i>walls, condition, conditional statement, background, hit event</i>
Self- driving car	To use conditional hit events to control the movement of a car on the screen.	<i>condition, conditional statement, background, direction, hit event</i>
Hungry snake	To make a simple game that uses conditional hit events to check if one object has hit another.	<i>conditional statement, condition, collide, object, hit event</i>
Pufferfish pop	To program a simple game where conditional events are used to check whether objects have collided.	<i>conditional statement, condition, collide, object, hit event, input</i>

Debugging: conditional events



INTRODUCTION TO VARIABLES

Learn how computers use variables to count things and keep track of what is going on, then create simple games which use a score variable.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Pop Game	To understand how a variable can be used to keep track of the score in a game.	<i>variable, score, start, click, time, alert</i>
Catch the Coconuts	To use variables to keep track of the score in a game that uses conditional events.	<i>variable, conditional event, score, time, value, hit event</i>
Healthy Eating	To use a variable to keep track of the score in a game that uses conditional events.	<i>variable, value, conditional event, execute, hit event, negative, collide</i>
Tablet Till	To learn how to use multiple different variables and to set the value of a variable.	<i>variable, set, change, cost, total, button</i>
Pirate Gold	To use a variable to keep track of the score in a game where the score increases, decreases or resets when different conditions are met.	<i>variable, score, event, condition, change, set</i>

Debugging: variables



REPETITION AND LOOPS

Learn how computers use repetition and loops to do things over and over again (and again!)

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Bugs in the Garden	To use a loop to do something repeatedly in a program	<i>repetition, loop, action, efficient</i>
Driving me Loopy	To write code that uses nested loops to create a car-driving program. Designs simple algorithms using loops and selection, i.e. if statements.	<i>repetition, loop, nesting, action, efficient, repeat</i>
Astronaut Orbit	To write the code to program a rocket to orbit round the spinning Moon, using the concepts of loops, regular or infinite repetition, and 'if statement' blocks.	<i>always, object, event, variable, condition, timer, if statement, loop</i>
Hot air balloon show	To use loops, a variable and if statements to create an animated scene of hot air balloons performing a repeating pattern in the sky.	<i>loop, repetition, variable, direction, if statement</i>



SPEED, DIRECTION AND COORDINATES

Learn how computers use numbers to represent things such as how fast things are moving, and where they are.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Faster and Slower	To set values in code to control the speed of an object.	<i>object, action, speed, property, value, accelerate, decelerate, debug</i>
Speedy Simulation	To use object properties (speed, heading and angle) to create a driving simulation.	<i>angle, speed, heading, value, iteratively, object properties, simulation</i>
Sailing the Seas	To create a sailing game where a boat's position on the screen is controlled by making changes to its co-ordinates.	<i>decomposition, angle, co-ordinates, condition, negative numbers, y-axis, x-axis, position</i>
Parachuting Cows	To write code including if statements to make an object rotate, and combine this with conditional events to make a game.	<i>y-axis, object, properties, conditional event, if statement</i>
Pirate Gold	To set friction to affect the speed and movement of a car in a driving simulation.	<i>friction, angle, heading, direction, speed, condition, simulation, overlap</i>

Debugging: variables



RANDOM NUMBERS AND SIMULATIONS

Learn how computers can generate random numbers and how these can be used in simulations.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Racing at Random	To be able to generate and display random numbers, and use these within the program for a carracing game	<i>variable, generate, random, simulate, x-axis</i>
Caterpillar Catchers	To write code for a game that uses random numbers to move objects in different directions	<i>random number, angle, coordinates, variable, degrees, condition, position</i>
Cross the Road	To write code that uses random numbers to move objects at random speeds and headings, and use this to create a game.	<i>random number, angle, coordinates, variable, degrees, value, condition</i>
Ping Pong	To create a ping-pong game, using random headings in specific ranges.	<i>random number, range, degrees, event, condition, heading, hit</i>
Pinball	To use random numbers in combination with variables and conditional hit events to create a realistic pinball game.	<i>random number, angle, heading, variable, degrees, condition, position</i>



MORE COMPLEX VARIABLES

Learn to use variables in more complex ways, and to manipulate inputs to create useful outputs.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Shape-Shifting	To write code that prompts the user to input the value of a variable, and use this to create an interactive block chart	<i>input, variable, property, background, grid, pixel, block, convert, value, alignment, unit, scale</i>
Pop Challenge	To use my knowledge of variables to make a balloon pop game that gets harder as users score more points.	<i>variable, condition, event, random, loop, if statement</i>
Toy Shop Till	To write the code for a shopping till using variables to store and calculate values.	<i>variable, discount, calculate, total, percentage</i>
Stopwatch	To create a stopwatch with stop, start, and reset buttons, and both digital and analogue displays.	<i>Boolean, analogue, digital, variable, loop, condition</i>

Debugging: variables



OBJECT PROPERTIES

Learn more about how computers use property values and parameters to store information about objects.

Lesson Focus/Progression	Lesson Objectives	Key Vocabulary
Don't Feed the Birds	To create a game where players stop objects moving by changing their properties.	<i>random, numbers, property, parameter, objects, variable, location, events, values</i>
Rocket Blaster	To write code that detects the properties of an object and passes the value of these properties (or a set of parameters) to other objects, and to use this to create a space game.	<i>friction, direction, angle, heading, variable, property, object, parameter, x-co-ordinate, y-co-ordinate</i>
Football Fun	To make a football game that passes the speed and heading of the pointer's movement to a ball on the screen.	<i>friction, heading, direction, angle, speed, variable, value, parameter, simulation</i>
Sheepdog	To make a game that moves objects around by getting information from events and passing object properties. To learn how to pass properties from one object to a second in order to make the second object move relative to the first.	<i>parameter, object, property, variable, heading, value</i>
Golf Game	To create a golf game by writing code that accesses and uses object properties, including passing the value of these properties to other objects (passing a set of parameters).	<i>simulation, decomposition, parameter, condition, variable, co-ordinates, property, value</i>