

## Unit: 5.1

### Coding

#### Key Learning

- To begin to simplify code.
- To create a playable game.
- To understand what a simulation is.
- To program a simulation using 2Code.
- To know what decomposition and abstraction are in computer science.
- To take a real-life situation, decompose it and think about the level of abstraction.
- To understand how to use friction in code.
- To begin to understand what a function is and how functions work in code.
- To understand what the different variables types are and how they are used differently.
- To understand how to create a string.
- To understand what concatenation is and how it works.

#### Key Resources



Tools



2Dos



2Chart



Free code gorilla

#### Key Vocabulary

##### Abstraction

A way of de-cluttering and removing unnecessary details to get a program functioning.

##### Action

The way that objects change when programmed to do so. For example, move or change a property.

##### Algorithm

A precise step by step set of instructions used to solve a problem or achieve an objective.

##### Concatenation

The action of linking a mixture of strings, variable values and numbers together in a series.

**Debug\ Debugging** Fixing code that has errors so that the code will run the way it was designed.

##### Decomposition

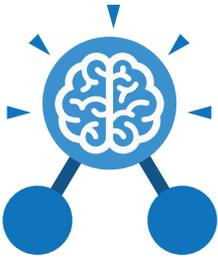
A method of breaking down a task into manageable components. This makes coding easier as the components can then be coded separately and then brought back together in the program.

##### Efficient

In coding, simplified code runs faster and uses less processing memory, it is said to be more efficient.

##### Flowchart

A diagram that uses specifically shaped, labelled boxes and arrows to represent an algorithm as a diagram.



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### Coding

#### Key Vocabulary

##### Event

An occurrence that causes a block of code to be run.

The event could be the result of user action such as the user pressing a key (**when Key**) or clicking or swiping the screen (**when Clicked, when Swiped**) or when objects interact (collision). In 2Code, the event commands are used to create blocks of code that are run when events happen.

##### Nesting

When coding commands are put inside other commands. These commands only run when the outer command runs.

##### Physical System

In this context, this is any object or situation that can be analysed and modelled. For example modelling the function of a traffic light, modelling friction of cars moving down surfaces or modelling the functions of a home's security system.

##### Function

A block or sequence of code that you can access when you need it, so you don't have to rewrite the code repeatedly. Instead, you simply 'call' the function each time you want it.

##### Object

Items in a program that can be given instructions to move or change in some way (action). In 2Code Gorilla, the **object types** are button number, input, text, shape turtle, character, object, vehicle, animal.

##### Properties

These determine the look and size of an object. Each object has properties such as the image, scale and position of the object.

##### Selection

A conditional decision command. When selection is used, a program will choose which bit of code to run depending on a condition. In 2Code selection is accomplished using 'if' or 'if/else' statements.

##### Input

Information going into the computer. This could be the user moving or clicking the mouse, or the user entering characters on the keyboard. On tablets there are other forms such as finger swipes, touch gestures and tilting the device.

##### Output

Information that comes out of the computer e.g. **sound, prompt, alert or print to screen.**

##### Repeat

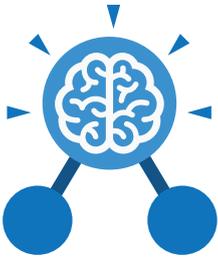
This command can be used to make a block of commands run a set number of times, until a condition is met or forever.

##### Sequence

This is when a computer program runs commands in order.

##### Simplify

In coding this is used to describe modifying the code to complete the same process with less lines of code.



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## Coding

### Key Vocabulary

#### Timer

Use this command to run a block of commands after a timed delay or at regular intervals.

#### Variable

A named area in computer memory. A variable has a **name** and a **value**. The program can change this variable value. Variables are used in programming to keep track of things that can change while a program is running. In 2Code, variables can be **strings**, **numbers** or **computer-generated** variables to control objects of a type.

### Key Images



Design

Open design mode in 2Code.

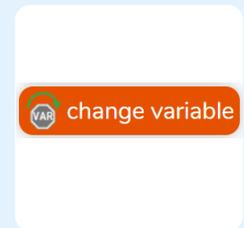


Exit Design

Switch to code mode in 2Code.



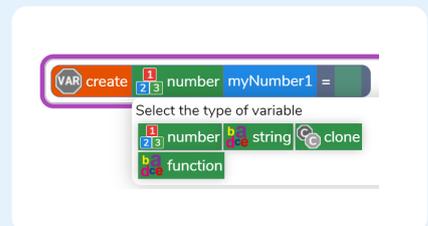
Add a new Tab to your code



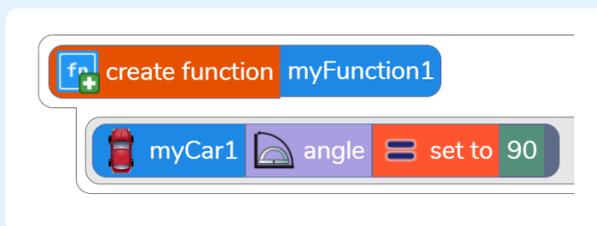
A change variable block.



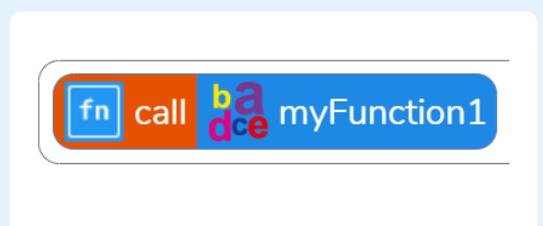
Example of combining variables and strings to print to the screen



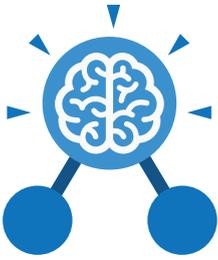
Creating a variable in 2Code



Creating a function in 2Code



Calling a function in 2Code



## Unit: 5.1

### Coding

#### Key Questions

##### What does simulating a physical system mean?

Creating a program where the objects behave as they would in the real world. For example, a football program that uses angles, speed and friction to simulate kicking a football. When simulating a physical system, you first must break the system down into parts that can be coded (decomposition). The different parts will come together to make the full simulation.

##### Describe how you would use variables to make a timer countdown and a scorepad for a game.

**Timer countdown:**  
Create a timer variable and set it to the starting number of seconds. Add a Timer command that repeats and subtracts 1 every second. Add a text object in design view to display this number.

**Score:**  
Create a variable to store the score, each time the user gains a point, change and display the value of the variable.

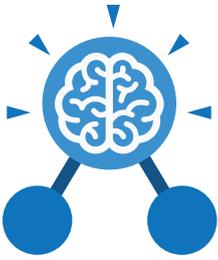
##### Give examples of how you could use the Launch command in 2Code.

Clicking on a button or other object in the program to opens another 2Code program or a webpage.

##### What do the terms decomposition and abstraction mean? Use examples to explain them.

Decomposition is breaking a task into its component parts so that each part can be coded separately. If you were coding a game of chess, you could decompose into the moves of the different pieces and the setup of the playing space.

Abstraction is removing unnecessary details to get the program functioning. In the example, the colour and size of the squares is not important to game play.



## Unit: 5.4 Databases

### Key Learning

- To learn how to search for information in a database.
- To contribute to a class database.
- To create a database around a chosen topic.

### Key Resources

**purple  
mash**



2Investigate



Avatar builder

### Key Questions

#### What is a database?

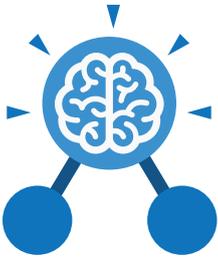
A collection of data organised in such a way that it can be searched, and information found easily. Database usually refers to data stored on computers.

#### Why is the collaborative feature important?

Making a database collaborative allows lots of people to enter information into the database at the same time. This is a lot quicker than one person entering the data by themselves.

#### In what ways can I sort information in a database?

A database can hold lots of information so it is essential that information can be effectively investigated. In 2Investigate, data can be searched and sorted in a variety of ways. It can also be presented pictorially.



## Unit: 5.4 Databases

### Key Vocabulary

#### Arrange

Sorting information in order against a search request.

#### Avatar

An icon or figure representing a person in a video game, Internet forum, etc.

#### Chart

A diagram that represents data. Charts include graphs and other diagrams such as pie charts or flowcharts.

#### Collaborative

Produced by, or involving, two or more parties working together.

#### Data

A collection of information, especially facts or numbers, obtained by observation, questions or measurement to be analysed and used to help decision-making.

#### Database

A set of data that can be held in a computer in a format that can be searched and sorted for information.

#### Field

A heading in a database record against which information is entered.

#### Group

Putting similar pieces of information together in a database so it is easy to read, understand and interpret.

#### Record

A collection of data about one item entered into a database.

#### Database Report

A way of producing a written paragraph that incorporates the data from the fields and records of the database.

#### Search

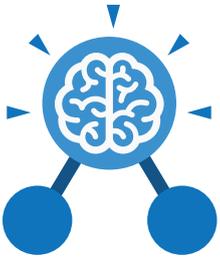
A way of finding information.

#### Sort

Organising data by a rule such as alphabetical or numerical.

#### Statistics

The study and manipulation of data, including ways to gather, review, analyse, and draw conclusions from data.



# Unit: 5.4

## Databases

### Key Images



Open, close or share a file



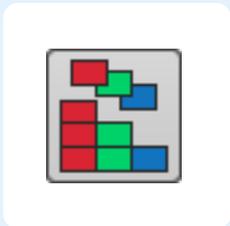
Design a new database



Add a record to the database



Find information in the database



Sort, group and arrange information



Statistics and reports



Represent the information as a chart

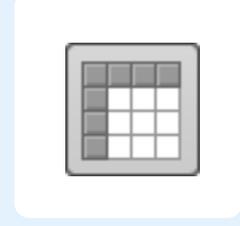
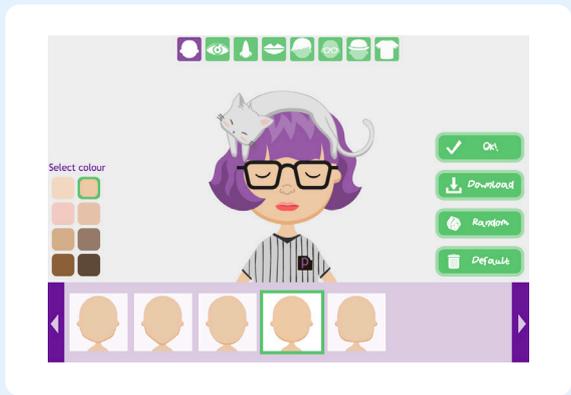
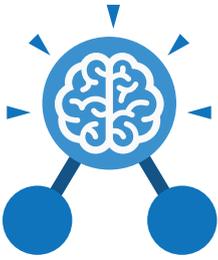


Table view of records



Avatar creator



## Unit: 5.6

### 3D Modelling

#### Key Learning

- To be introduced to 2Design and Make and the skills of computer aided design.
- To explore the effect of moving points when designing.
- To design a 3D Model to fit certain criteria.
- To refine and print a model.

#### Key Resources



2D&M

#### Key Vocabulary

##### 2D

Something that has only two dimensions; height and width.

##### 3D

Something that has three dimensions; height, width and depth.

##### 3D Printing

The action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.

##### CAD – Computer aided Design

A CAD computer program or app allows you to design a 3D object or environment in 2D and visualise it in 3D on the screen from many angles.

##### Design Brief

A document for a design project, defining the core details, including the goal and strategy.

##### Net

What a 3D shape would look like if it was unfolded and opened out flat.

##### Pattern Fill

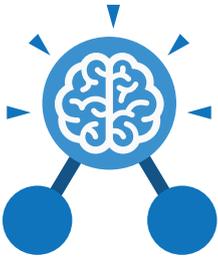
A tool where you can add a customised repeating pattern to the surface of the net.

##### Points

The points on a 3D net which create the corners of the 3D shape.

##### Template

Something that serves as a model for others to copy and edit.



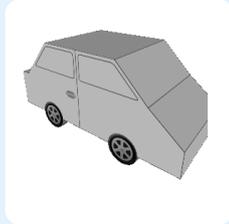
## Unit: 5.6

### 3D Modelling

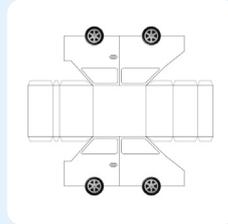
#### Key Images



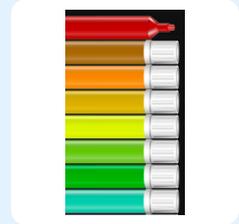
2D Image



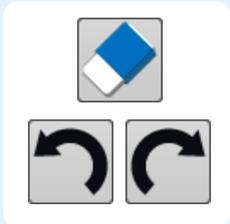
3D Image



Net View



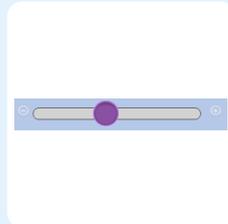
Colour Palette



Clear, Undo and Redo



Fill Options



Magnify

#### Key Questions

**What are the different view of an object available in 2Design and Make?**

Net, Points and 3D.

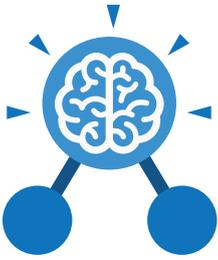
**How can the objects designed in 2Design and Make be turned into 3D objects?**

You can print the net and then cut and fold this into shape or you can convert the file into a format recognised by 3D printers.

**How is CAD software used in industry? Give some examples.**

It is used to design 3D objects in a 2D environment.

Some examples are; Architectural plans for buildings; designing layouts for interiors; designing objects such as packaging and designing mechanical components; designing shoes and clothing.



## Unit: 5.5

### Game Creator

#### Key Learning

- To plan a game.
- To design and create the game environment.
- To design and create the game quest.
- To finish and share the game.
- To self and peer evaluate.

#### Key Resources



2DIY3D

#### Key Vocabulary

##### Animation

Creating an illusion of movement.

##### Image

In this case, a picture displayed on the computer screen.

##### Texture

High frequency detail or colour information on a computer-generated graphic.

##### Computer game

A game played using a computer, typically a video game.

##### Instructions

Detailed information about how something should be done or operated.

##### Perspective

Representing three-dimensional objects on a two-dimensional surface to give the right impression of their height, width, depth, and position in relation to each other.

##### Customise

Modify (something) to suit an individual or task.

##### Interactive

Responding to a user's input on a computer or device.

##### Playability

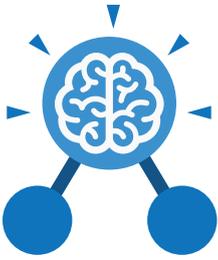
A measure of either the ease by which a video game may be played, or of the overall quality of its gameplay.

##### Evaluation

The making of a judgement about the value of something.

##### Screenshot

An image of the data displayed on the screen of a computer or mobile device.

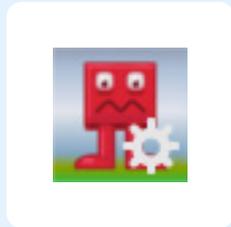


## Unit: 5.5 Game Creator

### Key Images



Open, close and share work



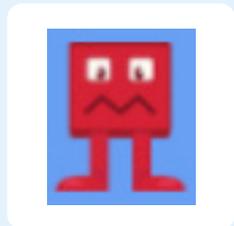
Change the settings of your game



Insert treasure into your game



Add images to your game



Insert enemies into your game



Drag to set the start position of your game



Play your game

### Key Questions

#### What is the 2DIY3D tool on Purple Mash?

2DIY 3D allows users to create a playing area, such as a maze, in 2D and then turn it into a 3D computer game. The aim is to avoid the 'baddies' and collect 'treasure'.

#### What makes a good computer game?

A good game designer gives the player continuous challenges in a visually stimulating environment, each of which leads to another challenge, to keep the game challenging and fun.

#### Why is it important to continually evaluate your game?

Evaluating your game as you make it allows you to think about ways in which it can be improved. Evaluation may also involve the views of other people who play your game.