MODELLING DATA - SPREADSHEETS

Key Terms

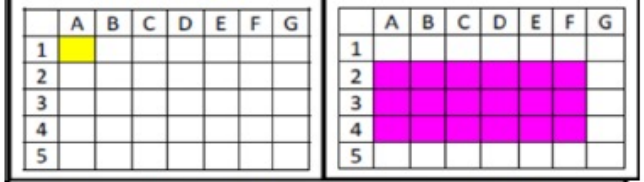
Modelling	A program which has been developed to mimic a real life system. Spreadsheets use mathematical formulas and calculations to predict what is likely to happen based on data recorded about what actually did happen in the past. Software includes Microsoft Excel and Google Sheets.
Cell	One box on a spreadsheet. A group of cells together is called a range.
Cell Reference	The unique 'address' of a cell on a spreadsheet, made up of the Column letter and Row number, e.g. A1
Range	A group of cells that are next to each other, e.g. A2:B6
Active cell	The currently selected cell. It has a thick black line around it with a small dot called the fill handle in the bottom right corner
Row	A group of cells 1 cell high going across a worksheet. In Excel, these are the numbers down the left side of the page.
Column	A group of cells 1 cell wide going from the top to the bottom of a worksheet. In Excel these are the letters going across the top of the page.
Label	This is a piece of text that explains what the data in the cell next to it represents.
Absolute cell reference	Refers to a specific cell and doesn't change when copied to other cells using the fill handle. E.g D3
Chart	A picture of data made from a range of cells. There are lots of types which are useful for different reasons, e.g. pie, line, scatter, area, radar, bar, radar etc
Legend	A table that explains which data is represented by different colours on a chart
Formula	Used in a spreadsheet cell, this starts with an '=' and combines numbers, mathematical operators and functions to manipulate data
Function	These are built in to spreadsheets and perform standard tasks, like finding the average, highest and lowest of a set of numbers. They always look like =FunctionName(Details the function needs). Tooltips will appear as you type them to tell you what details that function needs.
Fill	Copies the contents of a cell or range of cells into others by dragging the fill handle in the bottom right of the active cell or range.
Conditional Formatting	Changes what a cell looks like based on rules about the data a cell contains.

Key Facts / Methods / Processes/Questions

Where are Computer Models used?	Computer models are used in schools to predict student performance in exams, they are used to predict the weather, to predict how financial markets are going to change, to see whether car components will fit together before they are made and to see if a business is making enough money to stay open.
How are spreadsheets used in computer models?	Spreadsheets are very good at processing data and then presenting it in graphical form. Presenting data in the form of a chart makes it much easier to understand, which makes it more persuasive than a table of numbers.

Cell references begin with a letter, and finish with a number. EG: A1

A range is a selection of cells. EG: (A2:F4)



Golden rule: every formula always starts with an =

Name of the formula

See below for common formulae. Normally written in capitals.

=SUM(B10:B23)

= sign

An equal sign tells Excel that the cell contains a formula.

The selected range

The range used in the formula. This can be selected by clicking and dragging.

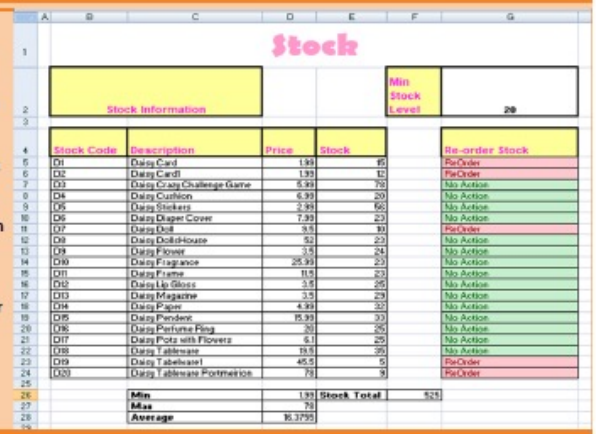
Cell Formatting

Number	tell the spreadsheet what type of data the cell contains, eg currency, percentage, date, time, etc
Alignment	align the text in the cell vertically (top, bottom or middle), horizontally (left or right) or at an angle
Font	change the font used, text size and colour
Border	– add a solid, dotted, dashed or coloured border to the cell
Adjusting column width and row height	To adjust a column's width or a row's height, move your mouse cursor between two columns or rows. Click and drag to resize. To automatically resize a row to fit the data entered in a cell, double-click between the current row and the row after it.

Modelling Data

Example Question

1) Begin by calculating Min Max Average for the price of the products sold
2) Use a function to calculate the total stock
3) Add an IF function to monitor stock levels. If stock falls below 20 then 'Re-Order' or ' No Action'.
4) Add conditional formatting on the Re-Order cells



Stock

Stock Information

Min Stock Level: 20

Stock Code	Description	Price	Stock	Re-order Stock
DI1	Daisy Card	1.99	15	ReOrder
DI2	Daisy Card1	1.99	12	ReOrder
DI3	Daisy Crazy Challenge Game	5.99	78	No Action
DI4	Daisy Cushion	6.99	20	No Action
DI5	Daisy Stickers	2.99	56	No Action
DI6	Daisy Diaper Cover	7.99	23	No Action
DI7	Daisy Doll	9.5	10	ReOrder
DI8	Daisy DollsHouse	52	23	No Action
DI9	Daisy Flower	3.5	24	No Action
DI10	Daisy Fragrance	25.99	23	No Action
DI11	Daisy Frame	11.5	23	No Action
DI12	Daisy Lip Gloss	3.8	25	No Action
DI13	Daisy Magazine	3.5	29	No Action
DI14	Daisy Paper	4.99	32	No Action
DI15	Daisy Pendent	15.99	33	No Action
DI16	Daisy Perfume Fling	20	25	No Action
DI17	Daisy Potz with Flowerz	6.1	25	No Action
DI18	Daisy Tableware	19.5	35	No Action
DI19	Daisy Tabelwaael	45.5	5	ReOrder
DI20	Daisy Tableware Portmeirion	78	9	ReOrder

Min	1.99	Stock Total	525
Max	78		
Average	16.3795		

Common Functions

= sum ( )	Adds a range of cells together.
= average ( )	Finds the average for a range of cells
= min ( )	Returns the smallest value in the range
= max ( )	Returns the highest value in the range
= count ( )	Counts how many cells meet a condition, e.g. count(A:A, "April") would return the number of times the word April (with a capital letter), occurs in column A

Advance Functions

IF	change the value of a cell if something is true, eg if a customer's total bill is over £100, deduct 10% from their bill.
COUNTIF –	adds up cells that meet a certain rule, eg count the number of students that achieved level 6.
VLOOKUP	matches contents of a cell with an answer, eg how much is a pepperoni pizza?

Charts & Graphs

Charts and graphs provide a visual representation of data, which can often be easier to understand. There are several types of charts and present data—You must always consider which would be a suitable chart or graph for your model.

LINE GRAPH – to show a change over time
PIE CHART – show the individual parts that make up a whole
BAR CHART – compare things that aren't directly related
SCATTER GRAPH – look for a pattern or link between two sets of data

NETWORKS FROM SEMAPHORES TO THE INTERNET

Key Terms (Networks)

Network	A group of **devices** connected together, either wirelessly or with a network cable.
Protocol	A set of rules
Network cable	Used to connect different devices together. They are often made up of a number of wires.
Hub	Connects a number of computers together. Ports allow cables to be plugged in from each connected computer.
Server	A powerful computer which provides services to a network
Router	Used to connect two separate networks together across the internet
Wired	Wired networks send data along cables.
Wireless	Wireless networks send data through the air using radio waves
3G /4G /5G	Wireless communications standards designed to provide different speeds for mobile devices, such as smartphones, tablets, and wireless hotspots
WiFi	a facility allowing computers, smartphones, or other devices to connect to the Internet or communicate with one another wirelessly within a particular area.
Bandwidth	Bandwidth is the amount of data that can be moved from one point to another in a given time.
Broadband	a high-capacity transmission technique using a wide range of frequencies, which enables a large number of messages to be communicated simultaneously.
Data capacity	How much **data** the storage type can hold, measured in **bits**
Buffering	In streaming audio or video from the **Internet**, **buffering** refers to downloading a certain amount of data before starting to play the music or movie.

What am i?

Wired versus wireless

Advantages of a wired network	Disadvantages of a wired network
Faster connection (little to no interference)	Cables can be a trip hazard and look unpleasant
Higher bandwidth	More expensive and time-consuming to add devices, as each device needs cables
Better security	Devices are in fixed positions (no portability
Advantages of wireless network	**Disadvantages of wireless network**
No trailing/trips/hazards	Lower bandwidth
It is quick and cheap to connect to new devices	Wireless connections can be weakened by walls and ceilings
Allows portability	Less Secure

Network Protocols

Layer	Protocols in this layer cover	Protocol Examples
1	Passing data (as electrical signals) over the physical network	**Ethernet**
2	Making connections between networks and directing data	**IP** (Internet protocol)
3	Controlling data flow eg checking data is sent and delivered	**TCP** (Transmission Control Protocol)
4	Turing data into websites and other applications and vice versa	**HTTP / FTP / SMTP**

Part of a website address

Web Browsers / Search Engines / Websites

Browsers	Google Chrome	
	Internet Explorer	
	Safari	
Search engines	Google	Google
	Bing	Bing
Websites	bbc.co.uk	
	youtube.com	

Key Terms (Internet)

Internet	The internet in a network of networks.
Internet Protocol	a set of rules governing the format of data sent over the Internet or other network.
IP address	a unique string of numbers separated by full stops that identifies each computer using the Internet Protocol to communicate over a network.
VoIP	Voice Over Internet Protocol - the set of rules that makes it possible to use the Internet for telephone or videophone communication.
IoT	A network of **Internet** connected objects able to collect and exchange data
Spam	irrelevant or unsolicited messages sent over the Internet, typically to a large number of users, for the purposes of advertising, phishing, spreading malware, etc.
WWW (World Wide Web)	Part of the internet that contains websites, web pages, and the links between them.
Web browser	A **browser** is a software application used to locate, retrieve and display content on the World Wide **Web**, including webpages, images, video and other files. FOR example Chrome / FireFox
Web server	A *web server* is a computer that runs websites. ... The basic objective of the *web server* is to store, process and deliver *web* pages to the users.
Web page	A hypertext document connected to the World Wide Web.
Search engine	A type of website that allows you to look up information on the World Wide Web.
URL	Uniform Resource Locator (**URL**) is another name for a web address
HTTPS	Stands for Hypertext Transfer Protocol Secure. This encrypts messages between a browser and the website so the messages cannot be understood by other devices.
HTTP	Stands for Hypertext Transfer Protocol. Messages are sent between a browser and a website in plain text and can be read and understood by other devices.
Domain Name	A **domain name** is a unique **name** that identifies a **website**.