Spreadsheet Modelling

Year 7 Computer Science • Building on Digital Literacy from 7.1

7.2 • Knowledge Organiser

📊 Spreadsheet Basics & Cell Referencing

- **Cell References:** Column letter + row number (e.g., `A1`, `B5`, `D10`)
- **Data Types:** Text, numbers, dates, formulas, logical values
- **Navigation:** Arrow keys, Ctrl+Home (start), Ctrl+End (last cell)
- **Selection:** Click and drag, Shift+Click, Ctrl+A (all)
- **Basic Operations:** Enter data, edit (F2), delete, copy/paste

```
A1: Student Name
B1: Maths Score
C1: Science Score
A2: Sarah B2: 85 C2: 92
```

💡 **Quick Tip:** Press `Ctrl+;` to insert today's date automatically.

🧮 Formulas & Basic Functions

- **Formula Start:** Always begin with = sign
- **Basic Operations:** + (add), - (subtract), * (multiply), / (divide)
- **Order of Operations:** Brackets first, then *, /, +, - (BODMAS)
- **Essential Functions:** `SUM`, `AVERAGE`, `COUNT`
- **Copying Formulas:** Relative references adjust automatically

```
=B2+C2 (Add two cells)
=SUM(B2:B10) (Add range B2 to B10)
=AVERAGE(B2:B10) (Mean of range)
=B2*0.1 (10% of B2 value)
```

📝 **Remember:** Functions use brackets and ranges use colon (:)

🎯 Computer Modelling Concepts

- **Computer Model:** Mathematical representation of real-world system
- **Purpose:** Test scenarios, predict outcomes, save time and money
- **Advantages:** Safe testing, quick changes, cost-effective, repeat tests
- **Limitations:** Simplified reality, depends on accurate data, assumptions
- **Examples:** Weather forecasting, flight simulators, economic planning

🎪 **Talent Show Model:** Calculate costs, revenue, and profit for different ticket prices and attendance levels.

Real Applications: Banks use models for loans, shops for stock levels, schools for budgets.

⚡ Advanced Functions & Analysis

- **Absolute References:** $ symbol fixes cell reference (`$A$1`)
- **MAX/MIN:** Find highest/lowest values in range
- **IF Function:** `IF(condition, true_value, false_value)`
- **COUNTIF:** Count cells meeting specific criteria
- **What-if Analysis:** Change inputs to see different outcomes

```
=IF(B2>=70,"Pass","Fail")
=MAX(B2:B10)
=COUNTIF(B2:B10,">=80")
=B2*$D$1 (B2 relative, D1 absolute)
```

🔄 **Scenario Testing:** Change ticket price in one cell to see impact on total profit.

🎨 Data Validation & Formatting

- **Data Validation:** Restrict input to valid data (dates, numbers, lists)
- **Conditional Formatting:** Highlight cells based on values/conditions
- **Number Formats:** Currency (£), percentage (%), decimal places
- **Cell Formatting:** Font, colour, borders, alignment
- **Professional Layout:** Consistent spacing, clear headers, logical structure

💼 **Professional Tips:**
- Use consistent fonts (Arial, Calibri)
- Highlight important data with colour
- Add borders to separate sections
- Format currency with £ symbol

📈 Charts & Data Visualisation

- **Chart Types:** Column (compare categories), line (trends), pie (parts of whole)
- **Chart Elements:** Title, axis labels, legend, data labels
- **Choosing Charts:** Column for comparison, line for time, pie for percentages
- **Customisation:** Colours, fonts, chart style, data range
- **Professional Presentation:** Clear titles, appropriate scale, readable labels

📊 **Chart Selection Guide:**
- Column: Monthly sales comparison
- Line: Temperature over time
- Pie: Budget breakdown by category

🤖 Automation with Macros

- **Macro Purpose:** Automate repetitive tasks and reduce errors
- **Recording Macros:** Capture series of actions for replay
- **Macro Buttons:** Assign macros to buttons for easy access
- **Time Saving:** Format reports, calculate totals, create charts instantly
- **Consistency:** Ensure same process followed every time

⚠️ **Security:** Only run macros from trusted sources. Macros can contain harmful code.

🚀 **Examples:** Format financial report, create monthly summary, send data to manager.

🌍 Real-World Applications

- **Business:** Budget planning, sales forecasting, profit analysis
- **Education:** Grade tracking, attendance monitoring, timetable planning
- **Science:** Experimental data analysis, statistical calculations
- **Personal:** Household budgets, savings calculators, expense tracking
- **Decision Making:** Compare options, model different scenarios

🎭 **Project Context:** TV talent show budget model helps producers decide ticket prices, judge whether show will be profitable, and plan for different audience sizes.

💰 **Key Skills for Life:** Financial literacy, logical thinking, data analysis, problem-solving.