

## Computing Substantive Knowledge Overview



**Sholing Junior School**  
Achieving Together

Substantive knowledge is the collection of established facts within a subject. It's the content that students need to know and provides the foundational knowledge needed to understand the world. At Sholing Junior School, we have arranged our computing knowledge under 4 main concepts. The knowledge of computer systems and networks, creating media, data and information and programme. The concept of e-safety is taught throughout the computing curriculum, within our a progressive PSHE curriculum and as part of Internet Safety Day.

|                               | Year 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Year 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Year 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Computer systems and networks | <b>Connecting Computers</b> <ul style="list-style-type: none"> <li>How digital devices function</li> <li>Input and output devices</li> <li>How digital devices can change the way we work</li> <li>How a computer network can be used to share information</li> <li>How digital devices can be connected</li> <li>The physical components of a network</li> </ul>                                                                                                                                                                                                     | <b>The internet</b> <ul style="list-style-type: none"> <li>How networks physically connect to other networks</li> <li>How networked devices make up the internet</li> <li>How websites can be shared via the World Wide Web</li> <li>How content can be added and accessed on the World Wide Web</li> <li>How the content of the WWW is created by people</li> <li>The consequences of unreliable content</li> </ul>                                                                                                                                                                                              | <b>Sharing information</b> <ul style="list-style-type: none"> <li>That computers can be connected together to form systems</li> <li>The role of computer systems in our lives</li> <li>How information is transferred over the internet</li> <li>How sharing information online lets people in different places work together</li> <li>How to contribute to a shared project online</li> </ul> <p>Different ways of working together online</p>                                                                                                                                                                                        | <b>Communication</b> <ul style="list-style-type: none"> <li>How search engines select results</li> <li>How search engines select results</li> <li>How search results are ranked</li> <li>Why the order of results is important, and to whom</li> <li>How we communicate using technology</li> <li>Different methods of online communication</li> </ul>                                                                                                                                                                                                                                                                                                                            |
| Creating Media                | <b>Stop-frame animation</b> <ul style="list-style-type: none"> <li>That animation is a sequence of drawings or photographs</li> <li>Plan an animation</li> <li>Identify the need to work consistently and carefully</li> <li>Review and improve an animation</li> <li>Evaluate the impact of adding other media to an animation</li> </ul> <b>Desktop publishing</b> <ul style="list-style-type: none"> <li>Recognise how text and images convey info</li> <li>How different layouts can suit different purposes</li> </ul> <p>The benefits of desktop publishing</p> | <b>Audio editing</b> <ul style="list-style-type: none"> <li>How sound can be digitally recorded</li> <li>That a digital recording is stored as a file</li> <li>That audio can be changed through editing</li> <li>That different types of audio can be combined and played together</li> <li>How to evaluate editing choices made</li> </ul> <b>Photo editing</b> <ul style="list-style-type: none"> <li>How images can be changed for different uses</li> <li>How to make good choices when selecting different tools</li> <li>That not all images are real</li> <li>How changes can improve an image</li> </ul> | <b>Video editing</b> <ul style="list-style-type: none"> <li>Recognise video as moving pictures, which can include audio</li> <li>Digital devices that can record video</li> <li>The features of an effective video</li> <li>That video can be improved through reshooting and editing</li> <li>The impact of the choices made when making and sharing a video</li> </ul> <b>Vector drawing</b> <ul style="list-style-type: none"> <li>That drawing tools can be used to produce different outcomes</li> <li>Recognise that vector drawings consist of layers</li> <li>How to group objects to make them easier to work with</li> </ul> | <b>Web page creation</b> <ul style="list-style-type: none"> <li>To review an existing website and consider its structure</li> <li>To plan the features of a web page</li> <li>To consider the ownership and use of images (copyright)</li> <li>To recognise the need to preview pages</li> <li>To outline the need for a navigation path</li> </ul> <b>3D modelling</b> <ul style="list-style-type: none"> <li>To compare working digitally with 2D and 3D graphics</li> <li>That physical objects can be broken down into a collection of 3D shapes</li> <li>How to design a digital model by combining 3D objects</li> <li>To develop and improve a digital 3D model</li> </ul> |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The importance of light when taking a photo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The positives and negatives of their vector drawing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Data and Information | <b>Branching databases</b> <ul style="list-style-type: none"> <li>How to identify the object attributes needed to collect relevant data</li> <li>To identify objects using a branching database</li> <li>Why it is helpful for a database to be well structured</li> </ul> <p>The similarities and differences between information shown in a pictogram with a branching database</p>                                                                                                                                                                                                 | <b>Data logging</b> <ul style="list-style-type: none"> <li>That data gathered over time can be used to answer questions</li> <li>That a data logger collects 'data points' from sensors over time</li> <li>To identify the data needed to answer questions</li> </ul> <p>To use collected data to answer questions</p>                                                                                                                                                                                                                                                                                                                             | <b>Flat-file databases</b> <ul style="list-style-type: none"> <li>The differences between paper and computer-based databases</li> <li>How grouping and then sorting data allows us to answer questions</li> <li>That tools can be used to select specific data</li> <li>That computer programs can be used to compare data visually</li> </ul> <p>How to apply my knowledge of a database to ask and answer real-world questions</p>                                                                                                                                                                                                                                   | <b>Spreadsheets</b> <ul style="list-style-type: none"> <li>Which questions can be answered using data</li> <li>That objects can be described using data</li> <li>That a formula can be used to produce calculated data</li> </ul> <p>Which is the most suitable way to present data</p>                                                                                                                                                                                                                                                                        |
| Programming          | <b>Sequence and animation</b> <ul style="list-style-type: none"> <li>Different pieces of code execute in a particular sequence</li> <li>To create a program that uses sequences for two different objects moving on the screen</li> <li>A timer helps to create a sequence of events</li> </ul><br><b>Events and actions</b> <ul style="list-style-type: none"> <li>How a sprite moves in an existing project</li> <li>How to adapt a program to a new context</li> <li>How to identify and fix bugs in a program</li> <li>How to design and create a maze-based challenge</li> </ul> | <b>Introduction to Variables</b> <ul style="list-style-type: none"> <li>How a variable can be used to keep track of the score in a game</li> <li>How to use variables to keep track of the score in a game that uses conditional events</li> <li>How to use multiple different variables and to set the value of a variable</li> </ul><br><b>Repetition in games</b> <ul style="list-style-type: none"> <li>That in programming there are infinite loops and count controlled loops</li> <li>To develop a design which includes two or more loops which run at the same time</li> <li>How to modify an infinite loop in a given program</li> </ul> | <b>Speed, Direction and Coordinates</b> <ul style="list-style-type: none"> <li>How to use object properties (speed, heading and angle) to create a driving simulation.</li> <li>How to change position using co-ordinates.</li> <li>How to write code including statements to make an object rotate and combine this with conditional events to make a game</li> </ul><br><b>Selection in games</b> <ul style="list-style-type: none"> <li>How selection is used in computer programs</li> <li>That a conditional statement connects a condition to an outcome</li> <li>That selection directs the flow of a program</li> <li>How to evaluate their program</li> </ul> | <b>More Complex Variables</b> <ul style="list-style-type: none"> <li>How to write code that prompts the user to input the value of a variable and use this to create an interactive block chart</li> <li>How to create a stopwatch with stop, start and reset buttons and both digital and analogue displays</li> </ul><br><b>Sensing</b> <ul style="list-style-type: none"> <li>That selection can control the flow of a program</li> <li>How to update a variable with a user input</li> <li>How inputs and outputs on a controllable device work</li> </ul> |