



## **KS3 Computing Curriculum**

*(currently in development)*

**The Kingswinford School**

## Curriculum Overview

Half Term	Year 7	Year 8	Year 9
1	<p><i>7.1 Digital Ready</i></p> <ul style="list-style-type: none"> <li>The school network</li> <li>Organising files</li> <li>Effective Internet research skills</li> <li>Staying safe</li> <li>Free online software introduction</li> <li>How a network works – topologies etc.</li> <li>PC basics (input and output devices)</li> </ul>	<p><i>8.1 Logical Thinking</i></p> <ul style="list-style-type: none"> <li>Computational thinking</li> <li>Boolean Logic</li> <li>Error checking</li> <li>Programming techniques (variables / selection / repetition)</li> </ul>	<p><i>9.1 Digital Literacy</i></p> <ul style="list-style-type: none"> <li>Cookies</li> <li>Anti-virus</li> <li>Target Marketing</li> <li>Firewalls</li> <li>Protecting online presence</li> <li>Privacy settings</li> <li>Make a quiz in ppt or app inventor to test these key facts</li> </ul>
2	<p><i>7.2 Computational Thinking</i></p> <ul style="list-style-type: none"> <li>Learning how to solve problems computationally.</li> </ul>	<p><i>8.2 Project – E-safety game</i></p> <ul style="list-style-type: none"> <li>Students use knowledge from Logical Thinking module to create a text based game</li> <li>The game teaches students to recognise unsuitable behaviour on the Internet</li> </ul>	<p><i>9.2 Data Representation</i></p> <ul style="list-style-type: none"> <li>How text, pictures and numbers are represented in Binary</li> <li>Data structures</li> <li>Binary</li> <li>Binary calculations</li> <li>Boolean logic</li> <li>Circuits (logic gates)</li> </ul>
3	<p><i>7.3 Programming Techniques</i></p> <ul style="list-style-type: none"> <li>Instructions</li> <li>Sequences</li> <li>Variables</li> <li>Repetition</li> <li>Selection</li> </ul>	<p><i>8.3 Cloud Computing Project</i></p> <ul style="list-style-type: none"> <li>Collaborative working</li> <li>Use tablets as well</li> <li>Safety concerns with working online</li> <li>Respecting others</li> <li>Google forms, sheets, slides, to collect, analyse, evaluate and present data to an audience</li> </ul>	<p><i>9.3 Understanding Computer Hardware</i></p> <ul style="list-style-type: none"> <li>Instructions</li> <li>Components</li> <li>Drivers</li> <li>RAM</li> <li>Hard drive</li> <li>Processor etc.</li> <li>Creative project – make a flash animation with some user interaction</li> </ul>
4	<p><i>7.4 Collaborative Working</i></p> <ul style="list-style-type: none"> <li>Google Hangouts</li> <li>Prezi</li> <li>Responsible use</li> <li>How does it all work?</li> <li>Work with a student in a different class on a project</li> </ul>	<p><i>8.4 Data Representation</i></p> <ul style="list-style-type: none"> <li>How numbers, text and pictures are represented in binary</li> <li>Activities for practicing converting numbers and text</li> </ul>	<p><i>9.4 Algorithms, Functions and Procedures</i></p> <ul style="list-style-type: none"> <li>Using Algorithms to solve problems</li> <li>Re-visiting programming techniques</li> <li>Functions</li> <li>Procedures</li> <li>Text-based programming</li> </ul>
5	<p><i>7.5 Sensing with Technology</i></p> <ul style="list-style-type: none"> <li>Make an instrument</li> <li>Use Makey Makey</li> </ul>	<p><i>8.5 How does the Internet work?</i></p> <ul style="list-style-type: none"> <li>How it works</li> <li>Search engines</li> <li>Trusting sites</li> <li>HTML &amp; CSS coding</li> </ul>	<p><i>9.5 Solving a Real World Problem – a Group Project</i></p> <ul style="list-style-type: none"> <li>Students are given a real world problem to solve</li> <li>Teacher groups the students</li> <li>Teacher is the project manager for all groups</li> <li>Use the cyclical method for developing a project (launch and iterate!!!)</li> </ul>
6	<p><i>7.6 Project with a given goal (tbd)</i></p> <ul style="list-style-type: none"> <li>Photoshop skills</li> <li>Publishing Skills</li> <li>Combining Software</li> </ul>	<p><i>8.6 Audience Focussed Project (tbd)</i></p> <ul style="list-style-type: none"> <li>Model state of real world problem (they choose one)</li> <li>Create a YouTube video, animation or program</li> </ul>	

## Learning Outcomes for each Module

### Computer Science (CS) Information Technology (IT) Digital Literacy (DL)

#### 7.1 Digital Ready

*Level 3 students should be able to:*

- CS Work with various forms of input
- CS Work with various forms of output
- IT Use search technologies effectively
- DL Use technology responsibly
- DL Identify a range of ways to report concerns about contact

*Level 4 students should be able to:*

- CS Understand how computer networks can provide multiple services, such as the World Wide Web
- CS Appreciate how search results are selected
- DL Identify a range of ways to report concerns about content
- DL Recognize acceptable / unacceptable behaviour

*Level 5 students should be able to:*

- CS Appreciate how search results are ranked
- CS Understand computer networks, including the Internet
- DL Be discerning in evaluating digital content

#### 7.2 Computational Thinking

*Level 3 students should be able to:*

- CS Use sequences in programs

*Level 4 students should be able to:*

- CS Debug programs that accomplish specific goals
- CS Use logical reasoning to detect and correct errors in programs

*Level 5 students should be able to:*

- CS Solve problems by decomposing them into smaller parts
- CS Use logical reasoning to explain how some simple algorithms work
- CS Use logical reasoning to detect and correct errors in algorithms

#### 7.3 Programming Techniques

*Level 3 students should be able to:*

- CS Write programs that accomplish specific goals
- CS Use sequences in programs

*Level 4 students should be able to:*

- CS Design programs that accomplish specific goals
- CS Design and create a program
- CS Use repetition in programs
- CS Control or simulate physical systems

*Level 5 students should be able to:*

- CS Use selection in programs
- CS Work with variables

## **7.4 Collaborative Working**

*Level 3 students should be able to:*

- IT Present information
- IT Design and create content
- DL Use technology responsibly

*Level 4 students should be able to:*

- IT Present data
- IT Select, use and combine internet services
- DL Recognize acceptable / unacceptable behaviour

*Level 5 students should be able to:*

- DL Understand the opportunities computer networks offer for collaboration

## **7.5 Sensing with Technology**

*Level 3 students should be able to:*

- CS Use sequences in programs
- CS Write programs to accomplish specific goals
- IT Collect information

*Level 4 students should be able to:*

- CS Use repetition in programs
- CS Control or simulate physical systems
- IT Collect data
- IT Analyse information

*Level 5 students should be able to:*

- CS Use selection in programs
- CS Work with variables
- IT Design and create systems
- IT Analyse data

## **7.6 Project with a given goal**

*Level 3 students should be able to:*

- IT Use a variety of software to accomplish given goals

*Level 4 students should be able to:*

- IT Select a variety of software to accomplish given goals

*Level 5 students should be able to:*

- IT Combine a variety of software to accomplish given goals
- IT Select use and combine software on a range of digital devices

## **8.1 Logical Thinking**

*Level 4 students should be able to:*

- CS Use logical reasoning to detect and correct errors in programs
- CS Use repetition in programs

*Level 5 students should be able to:*

- CS Solve problems by decomposing them into smaller parts
- CS Use selection in programs
- CS Work with variables
- CS Use logical reasoning to detect and correct errors in algorithms

*Level 6 students should be able to:*

- CS Understand simple Boolean logic

## **8.2 Project – E-safety Game**

*Level 4 students should be able to:*

- CS Design programs that accomplish specific goals
- CS Design and create a program
- CS Debug programs that accomplish specific goals
- CS Use repetition in programs
- CS Use logical reasoning to detect and correct errors in programs
- DL Identify a range of ways to report concerns about content
- DL Recognize acceptable / unacceptable behaviour

*Level 5 students should be able to:*

- CS Solve problems by decomposing them into smaller parts
- CS Use selection in programs
- CS Work with variables
- CS Use logical reasoning to detect and correct errors in algorithms
- IT Design and create systems

*Level 6 students should be able to:*

- CS Use computational abstractions
- CS Use a programming language to solve computational problems
- CS Understand simple Boolean logic
- IT Undertake creative projects with challenging goals
- DL Recognise inappropriate content
- DL Recognise inappropriate contact
- DL Know how to report concerns
- DL Attend to usability of digital artefacts

### **8.3 Cloud Computing Project**

*Level 4 students should be able to:*

- IT Select a variety of software to accomplish given goals
- IT Select, use and combine internet services
- IT Analyse information
- IT Evaluation information
- IT Collect data
- IT Present data
- DL Understand the opportunities computer networks offer for communication

*Level 5 students should be able to:*

- IT Combine a variety of software to accomplish given goals
- IT Select use and combine software on a range of digital devices
- IT Analyse data
- IT Evaluate data
- DL Understand the opportunities computer networks offer for collaboration

*Level 6 students should be able to:*

- IT Use multiple applications
- IT Work with applications across a range of devices
- DL Understand a range of ways to use technology respectfully
- DL Understand a range of ways to use technology safely

### **8.4 Data Representation**

*Level 4 students should be able to:*

- CS Recognise 0's and 1's as binary digits
- CS Convert numbers to binary digits

*Level 5 students should be able to:*

- CS Convert characters to binary digits

*Level 6 students should be able to:*

- CS Understand how text can be represented digitally in the form of binary digits
- CS Understand how pictures can be represented digitally in the form of binary digits

### **8.5 How does the Internet work?**

*Level 4 students should be able to:*

- CS Appreciate how search results are selected
- CS Understand how computer networks can provide multiple services, such as the World Wide Web

*Level 5 students should be able to:*

- CS Appreciate how search results are ranked
- CS Understand computer networks including the Internet
- CS Be discerning in evaluating digital content

*Level 6 students should be able to:*

CS Understand the hardware components that make up computer systems

## 8.6 Audience Focused Project (tbd)

*Level 4 students should be able to:*

IT Select a variety of software to accomplish given goals

*Level 5 students should be able to:*

IT Combine a variety of software to accomplish given goals

*Level 6 students should be able to:*

CS Model state of real world problems

DL Reuse digital artefacts for a given audience

IT Undertake creative projects with challenging goals

## 9.1 Digital Literacy

*Level 6 students should be able to:*

DL Understand a range of ways to use technology respectfully

DL Recognise inappropriate content

DL Recognise inappropriate contact

DL Know how to report concerns

DL Understand a range of ways to use technology safely

*Level 7 students should be able to:*

DL Protect privacy

DL Protect online identity

DL Attend to trustworthiness of digital artefacts

*Level 8 students should be able to:*

DL Understand a range of ways to use technology securely

DL Understand a range of ways to use technology responsibly

## 9.2 Data Representation

*Level 6 students should be able to:*

CS Understand how pictures can be represented digitally in the form of binary digits

CS Understand how text can be represented digitally in the form of binary digits

CS Understand how numbers can be represented in binary

CS Understand simple Boolean logic

*Level 7 students should be able to:*

CS Understand how pictures can be manipulated digitally in the form of binary digit

CS Understand how sounds can be manipulated digitally in the form of binary digit

CS Understand how text can be manipulated digitally in the form of binary digit

CS Be able to carry out simple operations on binary numbers

CS Understand Boolean logic in programming

CS Make use of appropriate data structures

*Level 8 students should be able to:*

- CS Understand how sounds can be manipulated digitally in the form of binary digits
- CS Understand use of Boolean logic in circuits

### **9.3 Understanding Computer Hardware**

*Level 6 students should be able to:*

- CS Understand the hardware components that make up computer systems
- IT Undertake creative projects with challenging goals

*Level 7 students should be able to:*

- CS Understand the software components that make up computer systems

*Level 8 students should be able to:*

- CS Understand how instructions are executed by computer systems
- CS Understand how computer systems communicate with other systems
- CS Understand how computer system components communicate with one another

### **9.4 Algorithms, Functions and Procedures**

*Level 6 students should be able to:*

- CS Use a programming language to solve computational problems

*Level 7 students should be able to:*

- CS Design modular programs that use procedures or functions
- CS Use at least one additional programming language (that must be textual) to solve computational problems
- CS Understand several key algorithms that reflect computational thinking
- CS Evaluate computational abstractions

*Level 8 students should be able to:*

- CS Use logical reasoning to compare the utility of alternative algorithms for the same problem
- CS Develop modular programs that use procedures or functions

### **9.5 Solving a Real World Problem – a Group Project (tbd)**

*Level 6 students should be able to:*

- CS Use computational abstractions
- CS Model state of real world problems
- IT Use multiple applications
- IT Work with applications across a range of devices
- DL Attend to usability of digital artefacts
- DL Reuse digital artefacts for a given audience

*Level 7 students should be able to:*

- CS Model behaviour of real world problems
- CS Model state of physical systems
- IT Combine multiple applications to achieve challenging goals



- IT Analyse data
- IT Meet the needs of known users
- DL Revise digital artefacts for a given audience

*Level 8 students should be able to:*

- CS Model behaviour of physical systems
- CS Design computational abstractions
- IT Create digital artefacts for a given audience
- IT Select multiple applications to achieve challenging goals
- DL Repurpose digital artefacts for a given audience
- DL Attend to design of digital artefacts