



# International School Khuzam (ISK)

**COMPUTER SCIENCE**

## Grades 6 - 8 Curriculum Book



## **Intent**

- Computer science is a fundamental part of our everyday life. With the emergence and advancement in modern technology, computer science has helped us form the modern and sophisticated world we live in.
- Advances in technology are transforming our lives at an incredible pace and shaping the future for the next generation.
- Students are encouraged to gain a passion and love of the technological world and a curiosity to explain how things work through observation and experimentation.
- At the International School Khuzam, our vision and the vision of the board is to engage young people in Computer Science and develop real world skills that could establish our students becoming the new leaders of our rapidly developing community, by using the advancements of technology.
- These advancements can only be accomplished through a stimulating and exciting learning environment that fosters curiosity by motivating and enthusing our students in their learning journey.

## **Implementation**

Computer Science at International School Khuzam:

- Our KS3 course follows the Exploring Computer Science scheme of work. It is clearly divided into real world units and all students will follow a balanced curriculum.
- As well as developing our students' knowledge and understanding of technological theory, our curriculum has an integrated working logical component which covers skills needed for analysing, processing, and problem solving with the use of computer programming.
- Students will develop their numeracy skills by using equations, formulas and making calculations in spreadsheets.
- There is also a clear focus on literacy and communication that seeks to develop students' confidence in articulating their logical ideas.
- During their practical Computer Science lessons, pupils will develop skills in communication and working with others to test programming concepts for themselves, as well as developing mathematical and science (physics, logical circuit theory) skills during the analysis of their results.
- Students are taught mixed abilities in whole class lessons.
- Home learning is set to develop, enhance and review students' learning.

## **Impact**

As a result of our Computer Science teaching at International School Khuzam, students are:

- challenged and engaged.
- confident when discussing computer science concepts.
- able to form links between topics across all specialisms.
- able to use a variety of resources to support and scaffold learning.
- making good progress.
- working to achieve and exceed their targets.

## Grade 6

### Lesson per Week

- There are 2 lessons

### Skills Developed

- Recognise the importance of logical reasoning and understand how to problem solve
- Make a prediction that is explained using logical theory
- Define independent variable, dependent and control variables
- Write a step-by-step method to detail what they did in a practical project
- Read and analyse simple logic diagrams to identify a relationship to real world problems
- Simply state what they have discovered as a result of their practical investigation
- Recall the name and use of the equipment they encounter
- Choose appropriate techniques to give accurate results for their programming solutions
- Describe what an error is and how they occur

### Literacy and Numeracy

- Use topic keywords in their scientific explanations
- Understand the command terms describe and explain
- Read text and pull-out important information
- Read simple program code and identify a relationship to the real world
- Calculate means with support, use equations to make calculations
- Suggest appropriate Boolean logic and equations

### Assessment

- Cycles of formative and summative assessments as per grade's Long-Term Plans

### Cross Curricular Links

- In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Technology, Engineering, Science and Maths to appreciate how these disciplines come together in real world situations.

### Special Requirements/Equipment

- Laptops

### Home Learning

- Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini-investigation or small project.

### Reading List and E-books

- Python for Kids: A Playful Introduction to Programming Jason R. Briggs (*No Starch, 2013*)
- Teach Your Kids to Code: A Parent-Friendly Guide to Python Programming Bryson Payne (*No Starch, 2015*).

Read up on the following pioneers of Computer Science

- Alan Turing
- Tim Berners Lee
- Steve Wozniak
- Steve Jobs
- Bill Gates
- Ada Lovelace

#### Useful Websites

- <https://www.bbc.co.uk/bitesize/clips/zwmf34j>
- [WWW.W3Schools](http://WWW.W3Schools)
- <https://microbit.org/>
- <https://www.bbc.co.uk/bitesize/guides/zdydmp3/revision/1>
- <https://www.bbc.co.uk/bitesize/guides/zc6rcdm/revision/1>

#### Setting

- Classes are mixed ability for 20-2021

#### Staff

- Mr Loganathan (Head of Department)
- Mr Mangera
- Mr Basharat
- Miss Alrawi

## Grade 7

Lesson per Week
<ul style="list-style-type: none"><li>• There are 2 lessons</li></ul>
Skills Developed
<ul style="list-style-type: none"><li>• Recognise the importance of logical reasoning and understand how to problem solve</li><li>• Make a prediction that is explained using logical theory</li><li>• Define independent variable, dependent and control variables</li><li>• Write a step-by-step method to detail what they did in a practical project</li><li>• Read and analyse simple program code to identify a relationship to real world problems</li><li>• Simply state what they have discovered as a result of their practical investigation</li><li>• Recall the name and use of the equipment they encounter</li><li>• Choose appropriate techniques to give accurate results for their programming solutions</li><li>• Describe what a syntax and logic error is and how they occur, with the ability to find a solution to rectify the code</li></ul>
Literacy and Numeracy
<ul style="list-style-type: none"><li>• Use topic keywords in their explanations</li><li>• Understand the command terms describe and explain</li><li>• Read program code and pull-out important information</li><li>• Read simple programme code and identify a relationship to the real world</li><li>• Calculate mathematical equations with support, use of programming to analyse remainders, pi and other mathematical calculations</li></ul>
Assessment
<ul style="list-style-type: none"><li>• Cycles of formative and summative assessments as per grade's Long-Term Plans</li></ul>
Cross Curricular Links
<ul style="list-style-type: none"><li>• In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Technology, Engineering, Science and Maths to appreciate how these disciplines come together in real world situations.</li></ul>
Special Requirements/Equipment
<ul style="list-style-type: none"><li>• Laptop</li></ul>
Home Learning
<ul style="list-style-type: none"><li>• Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini investigation or small project.</li></ul>
Reading List and E-books
<ul style="list-style-type: none"><li>• Python Tricks: A Buffet of Awesome Python Features Dan Bader (<i>dbader.org, 2017</i>)</li><li>• Fluent Python: Clear, Concise, and Effective Programming Luciano Ramalho (<i>O'Reilly, 2014</i>)</li><li>• <a href="https://www.computerhistory.org/babbage/adalovelace/">https://www.computerhistory.org/babbage/adalovelace/</a></li></ul>

Read up on the following pioneers of Computer Science:

- Alan Turing
- Tim Berners Lee
- Steve Wozniak
- Steve Jobs
- Bill Gates

#### Useful Websites

- <https://www.bbc.co.uk/bitesize/guides/zts8d2p/revision/1>
- <https://www.w3schools.com/>
- <https://www.youtube.com/watch?v=Z1Yd7upQsXY>
- <https://www.educba.com/python-programming-for-the-absolute-beginner/>

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- Mr Mangera
- Mr Basharat
- Miss Alrawi

## Grade 8

### Lesson per Week

- There are 2 lessons

### Skills Developed

- Recognise the importance of logical reasoning and understand how to problem solve
- Make a prediction that is explained using logical theory
- Define independent variable, dependent and control variables
- Write a step-by-step method to detail what they did in a practical project
- Read and analyse simple program code to identify a relationship to real world problems
- Simply state what they have discovered as a result of their practical investigation
- Recall the name and use of the equipment they encounter in the creation of databases
- Choose appropriate techniques to give accurate results for their programming solutions for the extraction of data using Beautiful Soup
- Describe what a syntax and logic error is and how they occur, with the ability to find a solution to rectify the code

### Literacy and Numeracy

- Use topic keywords in their explanations
- Understand the command terms describe and explain
- Read program code and pull-out important information
- Read simple programme code and identify a relationship to the real world
- Calculate mathematical equations with support, use of programming to analyse remainders, pi and other mathematical calculations

### Assessment

- Cycles of formative and summative assessments as per grade's Long-Term Plans

### Cross Curricular Links

- In every year group at KS3, we finish the year with a STEAM project. This allows students to work collaboratively on a project that covers Technology, Engineering, Science and Maths to appreciate how these disciplines come together in real world situations.

### Special Requirements/Equipment

- Laptop

### Home Learning

- Students will be given one piece of homework a week which will vary and could include a consolidation activity, review of keywords and their definitions, research task, mini investigation or small project.

### Reading List and E-books

- Python Tricks: A Buffet of Awesome Python Features Dan Bader (*dbader.org, 2017*)
- Fluent Python: Clear, Concise, and Effective Programming Luciano Ramalho (*O'Reilly, 2014*)

- Think Python: How to Think Like a Computer Scientist, 2nd edition Allen B. Downey (*O'Reilly, 2015*)
- <https://www.computerhistory.org/babbage/adalovelace/>

Read up on the following pioneers of Computer Science

- Alan Turing
- Tim Berners Lee
- Vint Cerf
- Guido van Rossum

### Useful Websites

- <https://www.bbc.co.uk/bitesize/guides/zts8d2p/revision/1>
- <https://www.w3schools.com/>
- <https://www.youtube.com/watch?v=Z1Yd7upQsXY>
- <https://www.educba.com/python-programming-for-the-absolute-beginner/>
- <https://pynative.com/python-sqlite/>
- <https://www.youtube.com/watch?v=byHcYRpMgl4>

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## Grades 6 to 8 Curriculum Maps

Term	Grade 6 Topics	Grade 7 Topics	Grade 8 Topics
Term 1	<p><b>E-safety</b></p> <ul style="list-style-type: none"> <li>Safety &amp; Computer Virus</li> <li>Social Networks &amp; Personal Info</li> <li>Cyber Bullying</li> </ul> <p><b>Logic Gates and Number Systems</b></p> <ul style="list-style-type: none"> <li>Binary to Denary</li> <li>Denary to Binary</li> <li>Logic Gates</li> <li>Truth Tables</li> <li>Logic Diagrams</li> </ul> <p><b>Basic Word Processing</b></p> <ul style="list-style-type: none"> <li>Tools, Tables, Fonts &amp; Paragraphs</li> <li>Pictures</li> <li>Menu Design</li> </ul> <p><b>Spreadsheets</b></p> <ul style="list-style-type: none"> <li>Data Types &amp; Formatting</li> <li>Formulas &amp; Functions</li> <li>If Statements</li> <li>Filters &amp; Graphs</li> </ul>	<p><b>Python Programming Flowcharts, Basic, Data Types, String &amp; Conditions</b></p> <ul style="list-style-type: none"> <li>Flowcharts</li> <li>Introduction</li> <li>Data Types</li> <li>Numbers and arithmetic</li> <li>Strings and string operations</li> <li>String Manipulation</li> <li>Conditions</li> </ul>	<p><b>Python Programming Conditions, Loop, String, list &amp; Functions</b></p> <ul style="list-style-type: none"> <li>Conditions</li> <li>Loops for</li> <li>Loops While</li> <li>For loop Vs While Loop</li> <li>String Manipulation</li> <li>Lists</li> <li>List with Loops</li> <li>Functions and Procedures</li> </ul>
Term 2	<p><b>Microbit</b></p> <ul style="list-style-type: none"> <li>Variables</li> <li>Shake, input &amp; Random</li> <li>Selections</li> <li>Loops</li> </ul> <p><b>Components of a computer system</b></p> <ul style="list-style-type: none"> <li>Hardware</li> <li>Software</li> <li>Computer Specification</li> <li>Input Devices</li> <li>Storage Devices</li> </ul> <p><b>Control Flow (Logo)</b></p> <ul style="list-style-type: none"> <li>Intro to LOGO</li> <li>Procedures in Logo</li> <li>Colours in Logo</li> <li>Create a sprite.</li> </ul>	<p><b>Python Programming Conditions, Loops, and Projects</b></p> <ul style="list-style-type: none"> <li>Conditions</li> <li>Nested Conditions</li> <li>Mini Project 1-Conditions and nested condition</li> <li>Loops for</li> <li>Loops While</li> <li>For loop Vs While Loop</li> <li>Mini Project 2-Conditions, nested condition and for loop</li> <li>Mini Project 3- Conditions and nested condition, for loop and while loop</li> </ul>	<p><b>Python Programming Functions, Procedures, Practical Programming</b></p> <ul style="list-style-type: none"> <li>Functions and Procedures</li> <li>Mini Project1 (Using Conditions and loops)</li> <li>Mini Project2 (Using Conditions, loops and lists)</li> <li>Mini Project3 (Using Conditions, loops, lists and functions)</li> <li>List comprehension</li> <li>Random number generation and sorting (using import functions)</li> </ul>
Term 3	<p><b>HTML (Developing Websites)</b></p> <ul style="list-style-type: none"> <li>Basics of a webpage</li> <li>Open/close Tags</li> <li>Headings &amp; tables</li> <li>Images on a webpage</li> <li>Hyperlinks</li> </ul> <p><b>Introduction to Python</b></p> <ul style="list-style-type: none"> <li>Intro to textual programming</li> <li>Output function in python</li> <li>Input function in python</li> <li>Variables and assignments in python</li> </ul>	<p><b>Python Programming Lists, List Comprehension, Functions &amp; Procedures and EOY Project</b></p> <ul style="list-style-type: none"> <li>Mini Project 2-Conditions, nested condition and for loop</li> <li>Mini Project 3- Conditions and nested condition, for loop and while loop</li> <li>List</li> <li>List comprehension</li> <li>Functions and Procedures</li> <li>End of year project –Creating an online game</li> </ul>	<p><b>Python Programming File Handling, MATPLOTLIB &amp; Practical Programming</b></p> <ul style="list-style-type: none"> <li>Mini Project1 (Using Conditions, loops and lists comprehension and functions)</li> <li>Mini Project2 (Using Conditions, loops and lists comprehension, function and random)</li> <li>File Handling (TXT, CSV)</li> <li>Graphs using (Matplotlib)</li> <li>End of year project (Using Conditions, loops, Procedure, list, file handling, Random and graphs)</li> </ul>