Computing Curriculum Plan 2020-21

Intent statement

Computing education at The Cedars Academy equips all our students to study and develop their skills through the use of various software and hardware to enable them to problem solve and complete projects through the use of electronic means. This equips our students in the future to decide and use the best piece of software available to complete the task at that time.

Rationale:

The rationale is to provide a progressive, knowledge rich KS3 and KS4 curriculum which flows across the years and is underpinned by the four Computational Thinking Skills (Algorithmic Thinking; Problem Solving; Abstraction and Decomposition). This will be achieved through a comprehensive 5 year curriculum model where we will be establishing key knowledge and skills that include effective practical and analytical approaches with Literacy and numeracy embedded throughout. This curriculum model will enable learners to gain access to higher GCSE content in earlier years to support accelerated learning and the transition between the two key stages will be bridged effectively. The computational knowledge and skills developed by learners will provide them with a secure foundation to access computing at post 16 and consequently STEM related career aspirations.

This curriculum is specified in detail to ensure that knowledge is remembered (not merely encountered) and built upon, enabling cognitive retrieval through sequential mapping of key concepts and synopsis. By grounding computational thinking skills in relevant and enriching knowledge, students become scholarly and confident demonstrating deeper understanding. Our knowledge rich curriculum reflects this approach to a computing education that will lead to automaticity in our students.

Curriculum Overview

Year 7 Key Stage 3 course	**Topic 1** Computing Fundamentals	**Topic 2** Scratch	**Topic 3** How Computers work	**Topic 4** Gender Balance in Computing	**Topic 5** Computer networks	**Topic 6** Microbits
Year 8 Key Stage 3 course	**Topic 1** Introduction to Computer Systems	**Topic 2** Data Modelling	**Topic 3** Introduction to Python	**Topic 4** Living in a Digital Society	**Topic 5** Cryptography	**Topic 6** Heroes of Computing
Year 9 Computer Science	**Topic 1** 2.4 Boolean logic	**Topic 2** 1.2 Memory and storage	**Topic 3** 2.1 Algorithms	**Topic 4** 2.2 Programming fundamentals	**Topic 5** 1.6 Ethical, legal, cultural and environmental impacts of digital technology	**Topic 6** 2.3 Producing robust programs
Year 10 Computer Science	**Topic 1** 2.5 Programming languages and Integrated	**Topic 2** 1.1 Systems architecture	**Topic 3** 1.3 Computer networks, connections and protocols	**Topic 4** 1.5 Systems software		

	Development Environments					
Year 11 Course?	**Topic 1 RO84**	**Topic 2 RO85**				

Timetabling

Our KS4 learner's access 6 or 7 hours of curriculum time per fortnight and KS3 have 1 hour per week. A significant minority of KS3 delivery is by non-specialists and as such the curriculum plan will incorporate 'unplugged' Computing topics ranked by priority to accommodate. All groups will be assigned a single teacher for their computing curriculum

Key Stage 3

At KS3 the curriculum has been designed to be built around embedded and consolidated skills that would have been utilised at KS2 and these are the key principles that are developed across the key stages. This builds on these foundations in terms of level of content and depth of challenge. The KS3 curriculum prepares the core concepts of that will be taught at KS4 based on the OCR Computer Science GCSE syllabus. Learners will be exposed to key concepts at KS3 that will prepare them for the challenges at KS4.

- Broad and balanced
- Alignment of Computing curriculum and key assessments across trust
- Sequencing based on the progression pathways in Computing with a spiralling, interleaved knowledge-based curriculum
- Key group support to raise progress
    - SEN, PP, LAPs, MAPs, HAPs, gender, ethnicity
    - HAPs: Plan to top/scaffold down
- Computational thinking skills embedded and explicitly taught as part of the curriculum
- Practical programming skills taught building from visual languages, to textual languages

Assessment

Each topic will be teacher assessed based on a set of criteria statements which are accessible and linked to the students work throughout that module/half term. This assessment will consist of knowledge based questions in the main, and an extended writing question(s). With the structure of the Key stage 3 course, being a spiralling building of modules that link as the years go on, the assessment will reflect this with retrieval of previous learning also being key in these assessments.

Key Stage 4

- Broad and balanced transitioning from KS3
- Alignment of Computing curriculum and key assessments across trust
- Sequencing based on the progression pathways in Computing with a spiralling, interleaved knowledge-based curriculum

- Key group support to raise progress
    - SEN, PP, LAPs, MAPs, HAPs, gender, ethnicity
    - HAPs: Plan to top/scaffold down
- Computational thinking skills embedded and explicitly taught as part of the curriculum
- One consistent GCSE Computer Science qualification available in all schools – GCSE Computer Science OCR

Other IT qualifications which have been available to students – Cambridge National Information Technologies; Cambridge National Creative iMedia.

Assessment

Common assessment points have been planned for across KS4 including unit assessments and teacher based assessment of classwork and end of year/trial exams. The marks for the student assessments will be stored in a common tracker and results will be made available where appropriate with colleagues/parents. The continued assessments at KS4 will ensure that there is a focus on the required practical components for computing that will be examined across Component 1 and Component 2 in the GCSE end of year exams.

With the use of comparative courses which are not run at our centre at GCSE, students are able to do practise coursework and units which can receive teacher assessment and provide a feedback opportunity which links to the course run assessed units. Thus giving the students the chance to practise and develop their computer science/ict knowledge and implementation. This will also offer the teacher the opportunity to support students in areas for development and check the grasp of core concepts prior to completing the assessed units on their enrolled course.

Assessment can therefore dictate the areas for whole class development, and also base activities around individual development of student knowledge and practise in the subject. Therefore partly dictating the next steps in the teaching through the addressing of core areas to improve and practise.

Literacy

The use of key terminology is of paramount importance and will facilitate a narrowing of the gap between advantaged and disadvantaged learners, addressing the key issue of social mobility. An awareness of the importance of key vocabulary must be shared by every teacher and this importance made known to all our learners. This curriculum will empower teachers to become more astute and confident in the use of key terminology that will enable our learners to analyse data and texts with confidence. This will in turn empower learners to write in a conceptualised and evaluative manner.

Our units align and encourage a structured approach revisiting skills and weaving in new learning with vocabulary from previous topics. The impact will be assessed through knowledge tests, end of topic assessments and written responses to longer answer questions. Our vision is that our students will use explicit vocabulary through explanations orally as well. Each unit will have its own key knowledge organiser with the relevant vocabulary highlighted. The vocabulary will be relevant to the subject content of the unit. It will feature as part of the resources for the unit and modelled by teachers within daily diet of a lesson, tested in vocabulary tests and integrated in the scheme of work.

Beyond the classroom

In order for our schools across LAT to work collaboratively and as a team half-termly meetings for the team of computing staff will be planned. These will be at different venues each half term and will focus on different aspects of the skills which underpin Computing across the key stages. In addition, challenge days, masterclasses and other events have been planned to encourage the enrichment and inclusion of all our learners. These events will be hosted

at the different locations across LAT. The aims of such events are to extend the learners and for them to develop both analytical and problem solving skills, amongst peers they may not have had the opportunity to work with within their own schools.

Differentiation

In following the set schemes of work, and modules with their project focus', students will be able to use the key skills and instructions taught and learnt in classes to further develop their own work and understanding of these. Thus meaning the differentiation can be established and pushed amongst the necessary cohorts, and focus more on the students that need support in understanding the basics so as to access the projects, but allowing the necessary focused support for students to extend themselves after learning these key concepts.

Students will be able to access the projects at a similar starting point with the entry level instructions being of a more basic nature, these instructions will develop into deeper understanding for those student that are more able and those less able students can focus on the core concepts

Marking and Feedback

Students will be guided through modules with corresponding workbooks. Each workbook being broken up into developing lessons and the work for each student will be filled in in these workbooks. The workbooks, and any other relevant work that is done by the students, will be saved into an electronic folder on the students computer area. This can be accessed or emailed to the class teacher during and at the end of each module.

Throughout lessons, staff will circulate to support students on the tasks that are given and the students will have a set criteria to achieve and be able to self and peer assess throughout these classes. When it comes to the end of the modules, students will have the necessary work to grade against set criteria that staff should be able mark the work and provide feedback in the following lesson to allow student to improve and close knowledge and implementation gaps for the relevant tasks.

To an observer this should look like an electronic workbook, with other relevant files also, with a list of criteria and a level that the student has achieved in securing those criteria. Notes can be left as to the strengths and areas to improve to support with the feedback process for students.

Going forward students can immediately correct issues with the work that is assessed and marked giving them the opportunity to develop that piece of work further. This relevant feedback loop can be used to develop future work for the student in following modules by being referred to throughout by the class teacher, and being used as a bench mark for strengths and areas to improve for future modules.

With the various modules using interconnecting core knowledge and processes, whilst using varying software, students can develop the key skills of using core knowledge to implement a project or task through varying software. So once a project is completed, feedback on and more development done. This cycle of implementation and development is practise and experience to use in future modules to develop and implement projects.

CPD (Please see individualised Learning Plans)

A cornerstone of learners' success is the ability of staff to explain key Computing concepts in a manner that engages the student and relates the new knowledge to their prior understanding and context. A CPD programme will also be facilitated following regular observations and analysis of reviews to suit the needs of the departments across LAT.