**Primary Curriculum Map (Computing)**

***Year 1 Undergraduate***

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| **University Curriculum – Year 1** | | | | | |
| **Session Sequence** | **Session Content Subject Specific Components/s** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment mode** |
| **Session 1**  **1 hour Lecture**  **As if by magic!** | * Growth in technology * LAN * Internet physicality * Modelling the Internet * WWW & services * Search engines & ranking * Effective searching * Teaching resources | 3.2; 3.4; 3.5; 4.3 | 3.e; 3.f; 3.g; 4.b; 4.f; | WILLINGHAM, D., 2021. Why don’t students like school? A cognitive scientist answers questions about how the mind works and what it means for the classroom. 2 nd ed. New Jersey, USA: Jossey-Bass  Sentance, S., Waite, J. and Kallia, M., 2019. *Teaching computer programming with PRIMM: a sociocultural perspective* Computer Science Education, v. 29 Doi: [10.1080/08993408.2019.1608781](http://doi.org/10.1080/08993408.2019.1608781)  Ofsted, 2023. Research review series: Computing. HMSO.  Bagge, P and Grover, S. Chapter 22 Variables In: Grover, S. (ed), 2020, Computer science in K-12: an A to Z handbook on teaching programming. Edfinity: USA.  Franks, R., 2021. A journey into physical computing. *Hello World* <https://helloworld.raspberrypi.org/articles/hw15-a-journey-into-physical-computing>  Various articles in Hello World June 2022 Sustainability & Computing: How can technology be good for the planet? <https://helloworld.raspberrypi.org/issues/19>  Kalelioglu, F. and Sentance, S., 2019 “Teaching with Physical Computing in School: The Case of the Micro:bit,” *Education and Information Technologies*, 25(4), pp. 2577–2603. doi: 10.1007/s10639-019-10080-8.  Barefoot Computing resources:   * Network Hunt * Modelling the Internet * Ranking Search Activity * Selecting Search Activity | `  Modify a programming project (tutor observation)  Complete an end of phase computing test (online formative test |
| **Session 2**  **Seminar**  **2 hours**  **What are algorithms and why should we care?** | * Input- Process – Storage – Output * Computational thinking * Algorithm design in KS1 * From algorithms to programming a digital device * Know and apply tinkering pedagogy | 2.4; 3.4; 3.5; 5.2; 8.2 | 1c; 2e; 3e; 3f; 3g; 3t; 4b; 4f |
| **Session 3**  **Seminar**  **2 hours**  **Dancing, noise monitors and gaming: controlling the world around us** | * programming concepts sequence, selection, repetition * pedagogical approaches for teaching programming (PRIMM, Parson’s problems) * Modify existing programs to develop subject knowledge and understanding of programming concepts | 1.2; 2.4; 2.7; 4.3; 4.4; 4.8; 4.10; 5.5; 8.2 | 1c; 2b; 2h; 3e; 3h; 4b; 4e; 6g; 8g |
| **Session 4**  **Seminar**  **2 hours**  **How do we keep score, measure our health or add a timer: making games more interesting** | * programming concept: variables * using variables in games * modifying a project * NCCE resource evaluation * Progression through CS strand | 1.3; 2. 7; 3.3; 4.2; 4.3; 4.4; 4.8; 5.1, 8.2 | 1c; 2a; 2d; 3h; 3j; 4n; 5a; 5i; 8f; 8g |
| **Session 5**  **Seminar**  **2 hours**  **Here come the robots!** | * Types of physical computing * Pros and cons of physical computing * Applying programming concepts to physical computing | 2.7; 2.8; 3.3; 4.2; 4.3; 4.4; 4.5; 4.8; 4.9; 4.10; 5.5; 5.7 | 1c; 2h; 3e; 3h, 3j; 4b; 4e; 4l; 6g; 6o; 8f |

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| **School Based Curriculum – Year 1** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in this subject, in at least one lesson throughout school.  **Planning :** Observe how expert colleagues break tasks down into constituent components, in this subject, for at least one lesson.  **Teaching :** Rehearse and refine particular approaches in this subject for a group/whole class. Deliver group/whole class teaching.  **Assessment :** Check prior knowledge and understanding during lessons.  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| Understand how the class teacher uses positive behaviour management strategies as they teach a practical subject through either:   * Discussing with the subject leader for computing how these strategies can be used in a computing lesson; or * Observing positive behaviour management in a computing lesson. Take note of how the room is set up prior to the lesson, regular routines (including packing up), when and where directions are provided and how equipment is managed.   Know how to scaffold learning in a Computing lesson using subject specific pedagogies, such as PRIMM, tinkering, Parson’s problems, paired programming/ collaborative working by observing or discussing with the subject leader (or recommended colleague)  Understand how to plan a computing lesson and ensure progress for all, through either discussing or co-planning with the subject leader or other experienced colleague | 4.4; 4.9; 4.10; 5.5; 7.1; 7.4 | 4a; 4b; 4l; 5n; 7d; 7e; 7h; 7i; 7j | Various articles in Hello World magazine <https://helloworld.raspberrypi.org/> Issue 21 focuses specifically on Primary teaching <https://helloworld.raspberrypi.org/issues/21>  Resources from Raspberry Pi Foundation <https://www.raspberrypi.org/research>  Resources from Computing at School <https://www.computingatschool.org.uk/>  National Centre for Computing Education resources <https://teachcomputing.org/>, including Promoting effective computing pedagogy <https://teachcomputing.org/pedagogy> | WDS  Observations  Regular discussion and feedback from mentor/ class teacher |

***Year 2 Undergraduate***

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| **University Curriculum – Year 2** | | | | | |
| **Session Sequence** | **Session Content Subject Specific Components/s** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment mode** |
| **Session 1**  **Let’s play! creative computing**  **2 hours** | |  | | --- | | * Retrieval activities for programming concepts and physical computing * Understanding microprocessors * Cross-curricular links to DT and STEM * Applying programming concepts (sequence, selection & repetition) to microprocessors * Using inputs and outputs | | 2.7; 2.8; 3.2; 3.5; 4.4; 4.8; 5.5; 7.1; 7.6 | 2a; 2d; 3h; 3j; 4e; 5a; 5e;7i; 7j | KALELIOGLU, F. AND SENTANCE, S., 2019 ‘Teaching with Physical Computing in School: The Case of the Micro:bit.’ *Education and Information Technologies*, 25(4), pp. 2577–2603. doi: 10.1007/s10639-019-10080-8.  LINDA, M., TEEMU, L., MERJA, B., & MARJAANA, V., 2023. 'Student and teacher co-agency when combining CT with arts and design in a cross-curricular project', *Computers and Education Open*. 4. <https://doi.org/10.1016/j.caeo.2023.100132>  ASHCRAFT, C., EGER, E. K. AND SCOTT, K. A., 2017. 'Becoming Technosocial Change Agents: Intersectionality and Culturally Responsive Pedagogies As Vital Resources for Increasing Girls' Participation in Computing,' *Anthropology & Education Quarterly*, 48(3), pp. 233–251.  Ofsted, 2023. *Research review series: Computing.* HMSO. | Participate in group/ class discussions, activities and Q&A  Collaboratively create programming and IT strand projects (tutor observation)  Collaboratively create an outline MTP  Complete an end of phase computing test (online formative test) |
| **Session 2**  **Swipe Right for Data**  **2 hours** | * Data, Information & knowledge * Branching databases (KS1) * Fields, records, flat file databases (KS2) * Searching, sorting, filtering databases to find answers to questions * Creating databases * Using spreadsheets to handle data * Progression and assessment in IT strand | 1.3; 3.5; 3.7; 4.2; 6.1; 6.4 | 2a; 2d; 3a; 3t; 4b; 4e; 6e; 6l; |
| **Session 3**  **Thank you for the music**  **2 hours** | * Computing and culturally responsive curricula * Computing and participation of girls * Develop subject knowledge of music and sound composition/ editing software and hardware for the IT strand * Explore progression frameworks for sound work * Explore cross-curricular and thematic contexts for sound work * Work collaboratively to create a soundscape using Audacity * Know how adaptive teaching can be used to support learners * Collaboratively plan a medium-term plan for sound work. * Adapt their planning to a particular class profile. | 1.3; 3.5; 3.7; 4.2; 5.3; 8.2 | 1c; 3a; 4a; 4e; 5a;6g; 6o; 8g |

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| **School Based Curriculum – Year 2** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in this subject, in at least one lesson throughout school.  **Planning :** Observe how expert colleagues break tasks down into constituent components over a sequence of lessons. Plan, as appropriate, for a sequence of lessons in all core and selected foundation subjects.  Plan, as appropriate, one lesson / group activity in all remaining subjects.  **Teaching :** Rehearse and refine particular approaches in all core and selected foundation subjects.  **Assessment :** Draw conclusions about what pupils have learnt by looking at patterns of performance over a number of assessments with support and scaffolding from expert colleagues  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| Review knowledge from Year 1 and complete any remaining tasks. It can be helpful to review these for a new school context.  Then develop and build on this by -  Demonstrating your understanding of planning, teaching and assessment in computing by either:  •plan, teach and assess a sequence of lessons for Computing based on the school’s medium-term plans; or  • annotating a medium-term plan from school and discussing with a member of staff how you might use this to plan a sequence of lessons for Computing, including planning for additional adults and adapting teaching and learning for SEND and EAL learners.  Know that schools use varied approaches to assessing children in Computing and that pupils’ progression can be assessed using the guidance in the Teacher’s Guide from NCCE (https://teachcomputing.org/curriculum/key-stage-1), the Computing at School’s progression pathways document (https://community.computingatschool.org.uk/resources/1692/single), code-it progression grid (http://code-it.co.uk/assessment-progression/) or other appropriate resources.    Understand that while there are no nationally recognised progression frameworks for Computing in England, know that the progression is monitored through the intended school’s curriculum. | *4.4; 4.9; 4.10; 5.5; 7.1; 7.4*  3.1; 3.3; 3.4; 3.5; 4.1; 4.2; 4.8; 5.1; 5.2; 5.3; 5.7; 6.1; 6.4 | *4a; 4b; 4l; 5n; 7d; 7e; 7h; 7i; 7j*  2a; 2c; 2d; 2g; 2i; 2j; 2k; 3a; 3c; 3d; 3e; 3f; 3j; 3l; 4b; 4d; 4e; 4n; 5a; 5g; 5o; 6a; 6e; 6g | Various articles in Hello World magazine <https://helloworld.raspberrypi.org/> Issue 21 focuses specifically on Primary teaching <https://helloworld.raspberrypi.org/issues/21>  Resources from Raspberry Pi Foundation <https://www.raspberrypi.org/research>  Resources from Computing at School <https://www.computingatschool.org.uk/>  National Centre for Computing Education resources <https://teachcomputing.org/>, including Promoting effective computing pedagogy <https://teachcomputing.org/pedagogy> | WDS  Observations  Regular discussion and feedback from mentor/ class teacher |

***Year 3 Undergraduate***

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| **University Curriculum – Year 3** | | | | | |
| **Session Sequence** | **Session Content Subject Specific Components/s** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment mode** |
| **Session 1**  **Here come the robots 2**  **2 hours** | * Retrieval activities for programming concepts and physical computing * Understanding robots in computing * Applying programming concepts to robots * Using inputs and outputs * Using variables to control outputs * Progression and assessment in Computer Science strand | 2.7; 2.8; 3.2; 3.5; 4.4; 4.8; 5.5; 7.1; 7.6 | 2a; 2d; 3h; 3j; 4e; 5a; 5e;7i; 7j | SENTANCE, S, BARENDSEN, E, HOWARD, NR, & SCHULTE, C (eds) 2023, Computer Science Education : Perspectives on Teaching and Learning in School, Bloomsbury Publishing Plc, London. Chapter 16 *Formative Assessment in the Computing Classroom*  SENTANCE, S, BARENDSEN, E, HOWARD, NR, & SCHULTE, C (eds) 2023, Computer Science Education : Perspectives on Teaching and Learning in School, Bloomsbury Publishing Plc, London. Chapter 15 *Investigating attitudes towards learning computer science.*  GROVER, S., SEDGWICK, V. & POWERS, K., 2020. *Feedback through formative check-ins* In: S. Grover (Ed.) Computer Science in K-12: An A to Z Handbook on teaching programming. Edfinity. | Participate in group/ class discussions, activities and Q&A  Work collaboratively on projects (tutor observation);  Work collaboratively on evaluating progression framework (tutor observation)  Discuss research in small groups (tutor-led discussion) |
| **Session 2**  **Swipe Right for Data**  **2 hours** | * Data, Information & knowledge * Branching databases (KS1) * Fields, records, flat file databases (KS2) * Searching, sorting, filtering databases to find answers to questions * Creating databases * Using spreadsheets to handle data * Progression and assessment in IT strand | 1.3; 3.5; 3.7; 4.2; 6.1; 6.4 | 2a; 2d; 3a; 3t; 4b; 4e; 6e; 6l; |
| **Session 3**  **Follow the white rabbit: creativity and safety**  **2 hours** | * E-safety retrieval activities * E-safety and broader safeguarding (FBV & Prevent) * Vector graphics * Green screen technologies * Progression and assessment in Digital Literacy strand | 3.5; 3.7; 4.2; 6.1; 8.2 | 3a; 3t; 4b; 4e; 8b |

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| **School Based Curriculum – Year 3** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in this subject, in at least one lesson throughout school.  **Planning :** Plan a sequence of lessons in all core and foundation subjects.  **Teaching :** Rehearse and refine particular approaches in all core and selected foundation subjects.  **Assessment :** Discuss with expert colleagues summative assessment, reporting and how data is used.  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| Review knowledge from Year 1 and Year 2 and complete any remaining task.  It can be helpful to review these in a new school context.  Then develop and build on this:  Understand that progression across the year groups should be across the three strands of computing (computer science, information technology and digital literacy)  Know that planning small step progression in Computing takes account of pupils with SEND from the outset  Understand how the policies for Computing are used to safeguard children online, both at home and at school  Know how subject leaders check the quality of education in computing  Understand how to monitor and assess progress in computing against the school’s curriculum plan. This might be through a sequence of lessons being taught by the trainee, or by reviewing children’ work from previous computing lessons. | *4.4; 4.9; 4.10; 5.5; 7.1; 7.4*  *3.1; 3.3; 3.4; 3.5; 4.1; 4.2; 4.8; 5.1; 5.2; 5.3; 5.7; 6.1; 6.4*  1.3; 5.7; 6.1; 6.2;  8.6 | *4a; 4b; 4l; 5n; 7d; 7e; 7h; 7i; 7j*  *2a; 2c; 2d; 2g; 2i; 2j; 2k; 3a; 3c; 3d; 3e; 3f; 3j; 3l; 4b; 4d; 4e; 4n; 5a; 5g; 5o; 6a; 6e; 6g*  1h; 5b; 5c; 5e; 5j; 5o; 6c; 6d; 6l; 6n; 8b; 8h; 8n | Various articles in Hello World magazine <https://helloworld.raspberrypi.org/> Issue 21 focuses specifically on Primary teaching <https://helloworld.raspberrypi.org/issues/21>  Resources from Raspberry Pi Foundation <https://www.raspberrypi.org/research>  Resources from Computing at School <https://www.computingatschool.org.uk/>  National Centre for Computing Education resources <https://teachcomputing.org/> including Promoting effective computing pedagogy <https://teachcomputing.org/pedagogy> | WDS  Observations  Regular discussion and feedback from mentor/ class teacher |