

# K-5 Scope and Sequence of Essential Computer Science Knowledge and Skills

| Grade Level                         | K   | 1  | 2   | 3  | 4  | 5  |
|-------------------------------------|---|--|---|--|--|--|
| CS Instruction                      | For all students at both campuses   |  |   |  |  |  |
|                                     | Integrated CS lessons or modules taught by classroom teachers   |  |   |  |  |  |
| Computational Thinking              | Create algorithms, or series of ordered steps, to solve problems.   |  |   |  |  |  |
|                                     |   | Decompose a problem, into smaller, more manageable parts.  |   |  |  |  |
|                                     |   |  | Collect, analyze, and represent data effectively.   |  |  |  |
|                                     |   |  |   |  | Demonstrate an understanding of how information is represented, stored, and processed by a computer. |  |
|                                     |   |  |   |  |  | Optimize an algorithm for execution by a computer. |
|                                     |   |  |   |  |  |  |
| Computing Practice & Programming    | Demonstrate dispositions amenable to open-ended problem solving and programming (e.g., comfort with complexity, persistence, brainstorming, adaptability, patience, propensity to tinker, creativity, accepting challenge). |  |   |  |  |  |
|                                     | Use hands-on learning and the physical environment to explore computing concepts.   |  |   |  |  |  |
|                                     | Write programs using visual (block-based) programming languages.  |  |   |  |  |  |
|                                     | Locate and debug errors in a program.   |  |   |  |  |  |
|                                     |   |  | Read a program and translate it into English. Explain how a particular program functions. |  |  |  |
|                                     |   |  |   | Design, code, test, and execute a program that corresponds to a set of specifications. |  |  |
|                                     |   |  | Modify and create animations, and present work to teammates.                              |  |  |  |
| Programming Skills                  | sequence  |  |   |  |  |  |
|                                     | iteration: simple loops   |  |   | while loops  | iteration: nested loops  |  |
|                                     |   | event handling & parallelism   |   |  |  |  |
|                                     |   |  |   | conditional statements   |  |  |
|                                     |   |  |   |  |  | randomization                                      |
|                                     |   |  |   |  | functions  |  |
| Suggested Platform                  | ScratchJr   |  |   | Scratch  |  |  |
|                                     | Blue Bot  |  |   |  | Micro:bit  |  |
| Computers and Communication Devices | Demonstrate an understanding of the relationship between hardware and software.   |  |   |  |  |  |
|                                     | Use input and output devices to operate computers.  |  |   |  | Identify major computer components.  |  |
|                                     |   | Describe the pervasiveness of computers and computing in everyday life.                                |   |  |  |  |
|                                     |   | Apply strategies for identifying and solving routine problems that occur during everyday computer use. |   |  |  |  |
| Community, Global, and              | Use information and technology responsibly and ethically.   |  |   |  |  |  |
|                                     | Describe the pervasiveness of computing in daily life.  |  |   |  |  |  |
|                                     | Identify careers that utilize computing and technology.   |  |   |  |  |  |

|                               |   |   |   |   |  |   |
|-------------------------------|---|---|---|---|--|---|
| Global, and Ethical Impacts   |   |   |   |   | Describe the widespread impact of the internet in connecting people and ideas from across the world.   |   |
| Collaboration                 | Work cooperatively and collaboratively with peers, teachers, experts, and others.   |   |   |   |  |   |
|                               | Engage in pair programming, as both driver and navigator.   |   |   |   |  |   |
|                               |   |   | Collaboratively design, develop, publish, and present products using technology resources that demonstrate and communicate curriculum concepts.   |   |  |   |
|                               |   |   |   |   | Exhibit dispositions necessary for collaboration: providing useful feedback, integrating feedback, understanding and accepting multiple perspectives, and socialization. |   |
| Exemplary Learning Activities | Determine and input a series of four to six sequential directions into a Blue Bot to find match with picture card. (ie position work on- student would input directions to find picture card of on) | Create a ScratchJr project that has 3 sprites, background and begins when flag clicked. | Use Reverse Enigineering to recreate a project. BootUp ScratchJr Lesson 4 Starry Night is a good one to begin with  | Recreate the BootUp Lesson 4 Knock Knock and instead of telling a joke, create two characters from a book they are reading and have a converstation | Remix a Scratch project to add and customize features. Debug a project to correct errors and achieve a given objective. Remix BootUp Scratch Lesson 6 Animated Card      | Use Scratch to create an interactive game with multiple levels and player controls. BootUp Scratch Lesson 17 An Amazing Maze Game |
| Q1                            | Unplugged with arrow keys. Exposure with Blue Bots  | Introduce yourself (three or more things about you)                                     | Using Lesson #17 My friends and family students will introduce their family. They should include voice recording and the touch start. Another option would be to have students create their own habitat and they should have 3 or more animals that with touch start they say a fact about that animal. | Interactive Collage#2 Making Meaning Characters, Setting WITH partners Driver and Navigator   | #1 Animate Your Name #4 REMIX knock knock joke   | All about me using #11 (photo editor) and/or virtual museum- #8   |

