# Course 2

## OVERVIEW

Students create programs with loops, events, and conditionals and write algorithms for everyday tasks. They will translate their names into binary, investigate different problem-solving techniques, and discuss societal impacts of computing. By the end of the curriculum, students create interactive games or stories they can share. While the description of some lessons may look similar to lessons in the Course 1, this review is important for those who have taken Course 1 as most will be at the lower elementary level. The complexity and depth of topics discussed are scaffolded appropriately to provide all students a rich and novel experience. Students starting in Course 2 will be students who can read in the lower and middle elementary grades.

**Lesson Sequence**

Online lessons are in regular text and unplugged activities are in **bolded** text.

| # | Lesson Name | Description |
|---|---|---|
| 1 | **Graph Paper Programming** | Students write an algorithm (a set of instructions) using a set of predefined commands to direct their classmates to reproduce a drawing. |
| 2 | **Real-Life Algorithms** | This lesson calls out ways we use algorithms in our daily lives. This lesson also focuses on the bigger picture of computer science and how algorithms play an essential part. |
| 3 | Maze: Sequence | Students write programs (algorithms for the computer) that get a character through a maze. They'll understand the importance of sequence in the programs they write. |
| 4 | Artist: Sequence | Students write programs to draw different lines and shapes. |
| 5 | **Getting Loopy** | This lesson introduces the programming concept of loops (repeated instructions) through a dance activity. Students will learn simple choreography and then be instructed to repeat it. |
| 6 | Maze: Loops | Student write programs in the Maze environment using loops. |
| 7 | Artist: Loops | Students write programs to draw different shapes while identifying patterns in their code. They learn about the programming concept of loops (repeated statements), which can be used to make their programs more efficient. |
| 8 | Bee: Loops | Students write programs using loops in the Bee environment. |
| 9 | **Relay programming** | Students run a relay race, where they dash across the yard to write an algorithm based on a "Graph Paper Programming" image. They can only write one instruction at a time and if there's an error, they have to erase everything back to the error. |
| 10 | Bee: Debugging | Students are presented with a pre-written program that fails to complete the puzzle. Students will have to "debug" or fix the pre-written program. |

| # | Lesson Name | Description |
|---|---|---|
| 11 | Artist: Debugging | Students are presented with a drawing and a pre-written program that fails to create that drawing. Students will have to "debug" or fix the pre-written program. |
| 12 | **Conditionals** | To learn about conditional statements, students play a card game and create rules like "If I draw a red card, I get a point" and "If I draw a black card, you get a point." |
| 13 | Bee: Conditionals | Students write programs using conditional statements using the Bee environment. |
| 14 | **Binary Bracelets** | Students create bracelets from a paper template that is a binary representations of the first letter of their name. Students learn that the same set of data can be represented in more than one way. |
| 15 | **The Big Event** | Students are introduced to the programming concept of "events," which are actions that a computer constantly monitors for. The teacher will press buttons on a fake remote, and student have to shout specific phases depending on which button is pressed. |
| 16 | Flappy | Using the concept of "Events," students will create their own game with events like "When the mouse is clicked, make the bird flap" and "When the bird hits the ground, end the game." |
| 17 | Play Lab: Create a Story | Students employ all the different programming concepts they have learned in the curriculum this far to make a customized, interactive story or game of their own. |
| 18 | **Your Digital Footprint** | Teachers introduce to students the idea that putting information about themselves online creates a digital footprint or "trail" that has consequences. |
| 19 | Artist: Nested Loops | Students write programs that draw interesting and beautiful patterns using nested loops. |