PIANO

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CURRICULUM OUTLINE COMPUTER SCIENCE FUNDAMENTALS

A Guide for Computer Science Fundamentals Curriculum

COMPUTER SCIENCE FUNDAMENTALS

4-11 YEARS

MODULE 1

DIGITAL CITIZENSHIP

➢ **LESSON 1: Safety in my online neighbourhood**

○ **DESCRIPTION:** Students will learn to program using commands like loops and events. The lessons featured in this course also teach students to meaningfully collaborate with others, investigate different problem-solving techniques, persist in the face of challenging tasks, and learn about internet safety.

■ My Online Neighborhood

➢ **Lesson 2: Learn to Drag and Drop**

○ **DESCRIPTION:** This skill-building lesson will give students an idea of what to expect when they head to the computer lab. It begins with a brief discussion introducing them to computer lab manners, then they will progress into using a computer to complete online puzzles.

■ Skill Building

MODULE 1

UNIT 2	SEQUENCING

➢ **LESSON 1: Happy Maps**

    ○ **DESCRIPTION:** This context-setting lesson brings together teams with a simple task: get the "flurb" to the fruit. Students will practice writing precise instructions as they work to translate instructions into the symbols provided.

        ■ Video: Happy Maps - Unplugged Activity

➢ **LESSON 2: Sequencing with Scrat**

    ○ **DESCRIPTION:** In this skill-building lesson, students will develop sequential algorithms to move a squirrel character from one side of a maze to the acorn at the other side. To do this they will stack code blocks together in a linear sequence.

        ■ Skill Building

➢ **LESSON 3: Programming with Scrat**

    ○ **DESCRIPTION:** In this skill-building lesson, students will continue to develop sequential algorithms.

        ■ Video: Pair Programming
        ■ Skill Building
        ■ Video: Debugging with the Step Button
        ■ Skill Building
        ■ Challenge
        ■ Practice

➢ **LESSON 4: Programming with Rey and BB-8**

    ○ **DESCRIPTION:** In this skill-building lesson, students will use their newfound programming skills in more complicated ways to navigate a tricky course with BB-8.

        ■ Video: Programming with Rey and BB-8
        ■ Skill Building
        ■ Challenge
        ■ Practice

MODULE 1

UNIT 3	LOOPS

➢ **LESSON 1: Happy Loops**

    ○ **DESCRIPTION:** This context-setting lesson revisits Happy Maps. This time, students will use loops to solve bigger, longer puzzles with their code.

➢ **LESSON 2: Loops with Scrat**

    ○ **DESCRIPTION:** In this skill-building lesson, students will practice loops in programming puzzles where the goal is to help the squirrel reach the acorn.

- Skill Building
- Video: Ice Age Loops
- Skill Building
- Challenge
- Practice

➢ **LESSON 3: Loops with Laurel**

    ○ **DESCRIPTION:** In this skill-building lesson, students continue learning the concept of loops. Here, students use loops to collect treasure in open cave spaces.

- Video: The Collector
- Skill Building
- Video: Using the Repeat Block
- Skill Building
- Challenge
- Practice

➢ **LESSON 4: Ocean Scene with Loops**

    ○ **DESCRIPTION:** In this skill-building lesson, students learn to draw images by looping simple sequences of instructions. Here, loops are creating patterns. At the end of this lesson, students will create their own images.

- Video: The Artist in Code Studio
- Skill Building
- Video: Loops in Artist
- Skill Building
- Challenge
- Practice
- Free Play

MODULE 1

EVENTS

➢ **LESSON 1: Happy Loops**

  ○ **DESCRIPTION:** In this context-setting lesson, the class will experience the concept of events through a game where they move or shout when you press buttons on a giant remote.

    ■ The Big Event - Unplugged Activity

➢ **LESSON 2: Mini-Project: On the Move with Play Lab**

  ○ **DESCRIPTION:** In this mini-project, students will use events in Play Lab and apply all of the coding skills they've learned to create an animated game. It's time to get creative and make a story in the Play Lab!

    ■ Video: Introduction to Play Lab
    ■ Free Play
    ■ Practice
    ■ Mini-project: Jorge the Dog

MODULE 1

UNIT 5

END OF COURSE PROJECT

➢ **LESSON 1: End of Course Project**

    ○ **DESCRIPTION:** In this project lesson, students apply what they have learned about sequencing and loops with the Artist.

        ■ Project

MODULE 2

DIGITAL CITIZENSHIP

➢ **LESSON 1: Digital Trails**

   ○ **DESCRIPTION:** Does what you do online always stay online? Students learn that the information they share online leaves a digital footprint or "trail." Depending on how they manage it, this trail can be big or small, and harmful or helpful. Students compare different trails and think critically about what kinds of information they want to leave behind.

      ■ Video: Follow The Digital Trail

MODULE 2

UNIT 2	SEQUENCING

➢ **LESSON 1: Move It, Move It**

- ○ **DESCRIPTION:** Students will program their classmates to step carefully around a large grid on the floor in this context-setting lesson.

  - ■ Move It Move it Video - Unplugged Activity

➢ **LESSON 2: Sequencing with Angry Birds**

- ○ **DESCRIPTION:** In this skill-building lesson, students will develop sequential algorithms to move a bird from one side of a maze to the pig at the other side. To do this they will stack code blocks together in a linear sequence.

  - ■ Video - Maze Intro: Programming with Blocks
  - ■ Skill Building

➢ **LESSON 3: Programming with Angry Birds**

- ○ **DESCRIPTION:** In this skill-building lesson, students will continue to develop sequential algorithms.

  - ■ Video: Pair Programming
  - ■ Skill Building
  - ■ Challenge
  - ■ Practice

➢ **LESSON 4: Programming with Harvester**

- ○ **DESCRIPTION:** Students will apply the programming concepts that they have learned to the Harvester environment in this skill-building lesson. Students will continue to develop sequential algorithm skills and start using the debugging process.

  - ■ Video: The Harvester
  - ■ Skill Building
  - ■ Video: Debugging with the Step Button
  - ■ Skill Building
  - ■ Challenge
  - ■ Practice

MODULE 2

UNIT 3	LOOPS

➢ **LESSON 1: Getting Loopy**

    ○ **DESCRIPTION:** In this context-setting lesson, students will learn to use loops to more easily communicate instructions by looking at the repeated patterns of a dance.

        ■ Video: Getting Loopy

➢ **LESSON 2: Loops with Harvester**

    ○ **DESCRIPTION:** In this skill-building lesson, students will help the harvester collect crops by using loops.

        ■ Skill Building
        ■ Video: Repeat Blocks
        ■ Skill Building
        ■ Challenge
        ■ Practice

➢ **LESSON 3: Loops with Laurel**

    ○ **DESCRIPTION:** In this skill-building lesson, students continue learning the concept of loops. Here, Laurel the Adventurer uses loops to collect treasure in open cave spaces.

        ■ Video: The Collector
        ■ Skill Building
        ■ Video: Using the Repeat Block
        ■ Skill Building
        ■ Challenge
        ■ Practice

➢ **LESSON 4: Drawing Gardens with Loops**

    ○ **DESCRIPTION:** In this skill-building lesson, students learn to draw images by looping simple sequences of instructions. Here, students use loops to create patterns.

        ■ Video: The Artist in Code Studio
        ■ Skill Building
        ■ Video: Repeat Blocks with the Artist
        ■ Skill Building
        ■ Challenge
        ■ Practice
        ■ Free Play

MODULE 2

UNIT 4

IMPACTS OF COMPUTING

➢ **LESSON 1: The Right App**

    ○ **DESCRIPTION:** In this exploratory lesson, students empathize with several fictional smartphone users to help them find the "right app" that addresses their needs.

        ■ The Right App - Unplugged Activity

MODULE 2

EVENTS

➢ **LESSON 1: The Big Event Jr.**

   ○ **DESCRIPTION:** In this context-setting lesson, the class will experience the concept of events through a game where they move or shout when you press buttons on a giant remote.

      ■ Video: The Big Event - Unplugged Activity

➢ **LESSON 2: Mini-Project: A Royal Battle with Events**

   ○ **DESCRIPTION:** In this mini-project, students will have the opportunity to learn how to use events in Play Lab and apply all of the coding skills that they've learned to create an animated game.

      ■ Video: Introduction to Play Lab
      ■ Free Play
      ■ Mini-Project: Royal Battle
      ■ Free Play

MODULE 2

UNIT 6

END OF COURSE PROJECT

➤ **LESSON 1: End of Course Project**

○ **DESCRIPTION:** In this project lesson, students apply what they have learned about sequencing and events in an open-ended project with Play Lab.

■ Project

MODULE 3

UNIT 1

DIGITAL CITIZENSHIP

➢ **LESSON 1: Putting a STOP to Online Meanness**

    ○ **DESCRIPTION:** The internet is filled with all kinds of interesting people, but sometimes, some of them can be mean to each other. With this role play, help your students understand why it's often easier to be mean online than in person, and how to deal with online meanness when they see it.

MODULE 3

UNIT 2	SEQUENCING

➢ **LESSON 1: My Robotic Friends Jr.**

  ○ **DESCRIPTION:** In this skill-building lesson, students will develop sequential algorithms to move a bird from one side of a maze to the pig at the other side. To do this they will stack code blocks together in a linear sequence, making them move straight, turn left, or turn right.

    ■ Video: Maze Intro - Programming with Blocks
    ■ Skill Building
    ■ Challenge
    ■ Practice
    ■ Prediction
    ■ Practice

➢ **LESSON 3: Debugging in Maze**

  ○ **DESCRIPTION:** In this skill-building lesson, students will encounter pre-written code that contains mistakes. They will need to step through the existing code to identify errors.

    ■ Video: Debugging with the Step Button
    ■ Skill Building
    ■ Challenge
    ■ Prediction
    ■ Practice

➢ **LESSON 2: Loops with Harvester**

  ○ **DESCRIPTION:** In this skill-building lesson, students will help the harvester collect crops by using loops.

    ■ Skill Building
    ■ Video: Repeat Blocks
    ■ Skill Building
    ■ Challenge
    ■ Practice

➢ **LESSON 4: Collecting Treasure with Laurel**

  ○ **DESCRIPTION:** In this skill-building lesson, students will continue to develop their understanding of algorithms and debugging. With a new character, Laurel the Adventurer, students will create sequential algorithms to get Laurel to pick up treasure as she walks along a path.

    ■ Video: The Collector
    ■ Skill Building
    ■ Challenge
    ■ Practice
    ■ Prediction
    ■ Practice

MODULE 3

➢ **LESSON 5: Creating Art with Code**

    ○ **DESCRIPTION:** In this skill-building lesson, students will take control of the Artist to complete drawings on the screen.

- Video: Artist Intro with JR Hildebrand
- Skill Building
- Challenge
- Practice
- Prediction

MODULE 3

LOOPS

- ➢ **LESSON 1: My Loopy Robotic Friends Jr.**

  - ○ **DESCRIPTION:** This context-setting lesson builds on the initial "My Robotic Friends" activity, featuring larger and more complicated designs.

    - ■ My Loopy Robotic Friends - Unplugged Activity

- ➢ **LESSON 2: Loops with Rey and BB-8**

  - ○ **DESCRIPTION:** This skill-building lesson has students using loops to help BB-8 efficiently traverse a maze.

    - ■ Video: Programming with Rey and BB-8
    - ■ Skill Building
    - ■ Prediction
    - ■ Video: Repeat Blocks with BB-8
    - ■ Skill Building
    - ■ Challenge
    - ■ Practice
    - ■ Prediction
    - ■ Practice

- ➢ **LESSON 3: Harvesting Crops with Loops**

  - ○ **DESCRIPTION:** Students loop new actions to help the harvester collect multiple veggies growing in large bunches in this skill-building lesson.

    - ■ Video: The Harvester
    - ■ Skill Building
    - ■ Challenge
    - ■ Prediction
    - ■ Practice

- ➢ **LESSON 4: Mini-Project: Sticker Art**

  - ○ **DESCRIPTION:** This mini-project lesson builds on the understanding of loops from previous lessons. Students will create unique artwork with the Artist.

    - ■ Mini-Project: Sticker Art
    - ■ Free Play

MODULE 3

UNIT 4   **EVENTS**

➢ **LESSON 1: The Big Event**

- ○ **DESCRIPTION:** In this context-setting lesson, students will learn that events are a great way to add flexibility to a pre-written algorithm.

    - ■ The Big Event - Unplugged Activity

➢ **LESSON 3: Mini-Project: Chase Game**

- ○ **DESCRIPTION:** This lesson combines skill-building around events with a mini-project where students get to build their own animated game.

    - ■ Video: Introduction to Play Lab
    - ■ Skill-Building
    - ■ Mini-project: Chase Game
    - ■ Free Play

➢ **LESSON 2: Build a Flappy Game**

- ○ **DESCRIPTION:** This lesson combines skill-building around events with a mini-project where students get to build their own Flappy Bird game. At the end of the lesson, students will be able to customize their game by changing the visuals or rules.

    - ■ Video: Code Your Own Flappy Game
    - ■ Skill Building
    - ■ Mini-project: Flappy Game

MODULE 3

DATA

- ➤ **LESSON 1: Picturing Data**
  - ○ **DESCRIPTION:** Students will collect data from a Play Lab project and visualize it using different graphs in this exploratory lesson.
    - ■ Picturing Data

- ➤ **LESSON 2: Binary Bracelets**
  - ○ **DESCRIPTION:** This exploratory lesson introduces the concept of binary which is how computers today store all sorts of information.
    - ■ Binary Bracelets - Unplugged Activity

MODULE 3

UNIT 6

END OF COURSE PROJECT

➢ **LESSON 1: End of Course Project**

  ○ **DESCRIPTION:** This project lesson takes students through designing, developing, and showcasing new Play Lab projects.

   ■ Exploration: Sample Project
   ■ Project

MODULE 4

UNIT 1

DIGITAL CITIZENSHIP

➢ **LESSON 1: Password Power-Up**

- ○ **DESCRIPTION:** Stronger, more secure online passwords are a good idea for everyone. But how can we help kids create better passwords and actually remember them? Use the tips in this lesson to help kids make passwords that are both secure and memorable.

MODULE 4

UNIT 2	SEQUENCING

➢ **LESSON 1: Graph Paper Programming**

    ○ **DESCRIPTION:** In this context-setting lesson, students use symbols to instruct each other to color squares on graph paper. By "programming" one another to draw pictures, students get an opportunity to experience some of the core concepts of programming in a fun and accessible way.

        ■ Graph Paper Programming - Unplugged Activity

➢ **LESSON 2: Introduction to Online Puzzles**

    ○ **DESCRIPTION:** In this skill-building lesson, students will practice their sequencing and debugging skills in maze puzzles.

        ■ Video: Maze Intro: Programming with Blocks
        ■ Skill Building
        ■ Challenge/Practice

➢ **LESSON 3: Relay Programming**

    ○ **DESCRIPTION:** This context-setting lesson will begin with a short lesson on debugging and persistence, then will quickly move to a race against the clock as students break into teams and work together to write a program one instruction at a time.

        ■ Relay Programming - Unplugged Activity

➢ **LESSON 4: Debugging with Laurel**

    ○ **DESCRIPTION:** In this skill-building lesson, students will practice debugging in the "collector" environment. Students will get to practice reading and editing code to fix puzzles with simple algorithms, loops and nested loops.

        ■ Video: De-bugging with the Step Button
        ■ Skill Building
        ■ Challenge/Practice

MODULE 4

UNIT 3

EVENTS

➢ **LESSON 1: Events in Bounce**

  ○ **DESCRIPTION:** In this context-setting/skill-building lesson, students will learn what events are and how programmers use them in video games. Students will build a game that they can customize with different speeds and sounds.

    ■ Skill-Building
    ■ Free Play

➢ **LESSON 3: Dance Party**

  ○ **DESCRIPTION:** In this skill-building lesson, students will program an interactive dance party.

    ■ Video: Warm Up
    ■ Practice
    ■ Video: Events
    ■ Events
    ■ Video: Measures
    ■ Measures
    ■ Video: Properties
    ■ Properties
    ■ Video: Wrap-up
    ■ Free Play

➢ **LESSON 2: Build a Star Wars Game**

  ○ **DESCRIPTION:** In this skill-building lesson, students will practice using events to build a game that they can share.

    ■ Video: Star Wars Project
    ■ Skill-Building
    ■ Free Play

MODULE 4

UNIT 4

LOOPS

➢ **LESSON 1: Loops in Ice Age**

    ○ **DESCRIPTION:** This context-setting/skill-building lesson will quickly introduce students to loops.

        ■ Skill-Building
        ■ Video: Using the Repeat Block
        ■ Skill Building
        ■ Challenge
        ■ Practice

➢ **LESSON 3: Nested Loops in Maze**

    ○ **DESCRIPTION:** In this skill-building lesson, students will learn how to program a loop inside of another loop.

        ■ Skill Building
        ■ Video: Nested Loops with the Bee
        ■ Prediction
        ■ Skill Building
        ■ Challenge
        ■ Practice
        ■ Prediction

➢ **LESSON 2: Drawing Shapes with Loops**

    ○ **DESCRIPTION:** This skill-building lesson builds on the understanding of loops from the previous lesson and doubles as a debugging exercise for extra problem-solving practice.

        ■ Video: Artist Intro with JR Hildebrand
        ■ Skill Building
        ■ Video: Loops with the Artist
        ■ Skill Building
        ■ Challenge
        ■ Practice

MODULE 4

UNIT 5	CONDITIONALS

➤ **LESSON 1: Conditionals with Cards**

   ○ **DESCRIPTION:** In this context-setting lesson, students will write conditional (if/else) statements to state the rules of simple card games.

      ■ Conditionals with Cards - Unplugged Activity

➤ **LESSON 2: Looking Ahead with Minecraft**

   ○ **DESCRIPTION:** This skill-building lesson gives students the chance to practice concepts that they have learned up to this point and get their first experience with conditionals!

      ■ Skill Building
      ■ Challenge
      ■ Free Play

➤ **LESSON 3: If/Else with Bee**

   ○ **DESCRIPTION:** In this skill-building lesson, your class will continue to code with conditionals, allowing them to write code that functions differently depending on the specific conditions the program encounters.

      ■ Video: Conditionals: If Statements
      ■ Prediction
      ■ Skill Building
      ■ Video: Conditionals: If and If/Else Statements
      ■ Skill Building
      ■ Prediction
      ■ Challenge
      ■ Practice
      ■ Challenge

➤ **LESSON 4: While Loops in Farmer**

   ○ **DESCRIPTION:** In this skill-building lesson, students will be working to fill holes and dig dirt in Farmer, but they will not know the size of the holes or the height of the mounds of dirt. To solve these puzzles, students will use a new kind of loop.

      ■ Skill Building
      ■ Video: While Loops with the Farmer
      ■ Prediction
      ■ Skill Building
      ■ Challenge
      ■ Practice
      ■ Prediction
      ■ Challenge

MODULE 4

| UNIT 5 | ➢ **LESSON 5: Until Loops in Maze** |

○ **DESCRIPTION:** In this skill-building lesson, students will learn about "until" loops. Students will build programs that have the main character repeat actions "until" they reach their desired stopping point.

- ■ Skill Building
- ■ Video: Repeat Until Statements
- ■ Prediction
- ■ Skill Building
- ■ Challenge
- ■ Practice
- ■ Prediction

MODULE 4

UNIT 6

END OF COURSE PROJECT

➢ **End of Course Project**

    ○ **DESCRIPTION:** This project lesson takes students through the process of designing, developing, and showcasing new projects!

- Skill Building
- Video: Repeat Until Statements
- Prediction
- Skill Building
- Challenge
- Practice
- Prediction

MODULE 5

DIGITAL CITIZENSHIP

➢ **LESSON 1: Be A Super Digital Citizen**

  ○ **DESCRIPTION:** Online tools are empowering for kids, and they also come with big responsibilities. But do kids always know what to do when they encounter cyberbullying? Show your students appropriate ways to take action and resolve conflicts, from being upstanders to helping others in need.

    ■ Be a Super Digital Citizen

➢ **LESSON 2: Private and Personal Information**

  ○ **DESCRIPTION:** It's in our students' nature to share and connect with others. But sharing online comes with some risks. How can we help kids build strong, positive, and safe relationships online? Help your students learn the difference between what's personal and what's best left private.

MODULE 5

UNIT 2

SPRITES

➢ **LESSON 1: Swimming Fish with Sprite Lab**

  ○ **DESCRIPTION:** Students will program a simple animated underwater scene in this skill-building lesson

    ■ Video: Introducing Sprite Lab
    ■ Prediction
    ■ Skill Building
    ■ Video: How to Make a Sprite
    ■ Practice
    ■ Free Play

➢ **LESSON 3: Mini-Project: About Me**

  ○ **DESCRIPTION:** Students will apply their understanding of sharing personal and private information on the web by creating an interactive poster in this mini-project.

    ■ Exploration: Rikki's Poster
    ■ Mini-Project: About Me

➢ **LESSON 2: Hello World**

  ○ **DESCRIPTION:** In this skill-building lesson, students will learn to create and animate sprites and make them interactive using events.

    ■ Video: Hello World: Welcome to Sprite Lab
    ■ Skill Building
    ■ Video: Hello World: Programming with Events
    ■ Skill Building
    ■ Video: Hello World: Do What You Want
    ■ Free Play

MODULE 5

UNIT 3	NESTED LOOPS

➢ **LESSON 1: Drawing with Loops**

    ○ **DESCRIPTION:** This context-setting lesson shifts the focus from Sprite Lab to the Artist, a new tool that students will explore throughout the remainder of the course.

        ■ Video: Artist Intro with JR Hildebrande
        ■ Skill Building
        ■ Video: Loops with the Artist
        ■ Skill Building
        ■ Practice

➢ **LESSON 3: Mini-Project: Design a Snowflake**

    ○ **DESCRIPTION:** This mini-project lesson takes students through a series of exercises to create snowflake images using characters from the Frozen movies.

        ■ Mini-Project: Snowflake #1
        ■ Mini-Project: Snowflake #2

➢ **LESSON 2: Fancy Shapes using Nested Loops**

    ○ **DESCRIPTION:** In this skill-building lesson, students will create intricate designs using the Artist. The lesson ends with an opportunity for students to create their own designs.

        ■ Skill Building
        ■ Video: Nested Loops
        ■ Skill Building
        ■ Practice
        ■ Free Play

MODULE 5

UNIT 4

FUNCTIONS

- ➢ **LESSON 1: Songwriting**

  - ○ **DESCRIPTION:** This context-setting lesson will help students understand why combining chunks of code into functions can be a helpful practice.

    - ■ Songwriting - Functions Unplugged Activity

- ➢ **LESSON 3: Functions with Artist**

  - ○ **DESCRIPTION:** In this skill-building lesson, students will use functions with the Artist.

    - ■ Prediction
    - ■ Skill Building
    - ■ Practice

- ➢ **LESSON 2: Functions in Minecraft**

  - ○ **DESCRIPTION:** In this skill-building lesson, students will begin to understand how functions can be helpful!

    - ■ Video: Minecraft - The Agent
    - ■ Skill Building
    - ■ Video: Minecraft - Repeat Loops
    - ■ Skill Building
    - ■ Video: Minecraft - Functions
    - ■ Skill Building
    - ■ Video: Minecraft - Congratulations
    - ■ Free Play

MODULE 5

CONDITIONALS

➢ **LESSON 1: Conditionals in Minecraft: Voyage Aquatic**

○ **DESCRIPTION:** In this skill-building/context-setting lesson, students will get the chance to practice content that they have learned up to this point, as well as getting a sneak peek at conditionals!

■ Video: Minecraft: Voyage Aquatic Introduction
■ Skill Building
■ Video: Minecraft: Voyage Aquatic Repeat Until
■ Skill Building
■ Video: Minecraft: Voyage Aquatic Conditionals
■ Skill Building
■ Video: Minecraft: Voyage Aquatic Congratulations
■ Free Play

➢ **LESSON 3: Functions with Harvester**

○ **DESCRIPTION:** In this skill-building lesson, students will use conditionals with functions to harvest crops in Harvester.

■ Video: The Harvester
■ Skill Building
■ Challenge
■ Practice
■ Prediction

➢ **LESSON 2: Conditionals with the Farmer**

○ **DESCRIPTION:** This skill-building lesson focuses on a new type of programming puzzle, featuring a farmer who needs to prepare her fields for planting crops.

■ Skill Building
■ Video: While Loops with the Farmer
■ Prediction
■ Skill Building
■ Video: Repeat Until Blocks
■ Skill Building
■ Video: "If/Else"
■ Challenge
■ Practice

MODULE 5

IMPACTS OF COMPUTING

- ➢ **LESSON 1: Designing for Accessibility**
  - ○ **DESCRIPTION:** In this exploratory lesson, students will learn about accessibility and the value of empathy through brainstorming and designing accessible solutions for hypothetical apps.
    - ■ Designing for Accessibility

- ➢ **LESSON 2: Digital Sharing**
  - ○ **DESCRIPTION:** This exploratory lesson helps students understand the challenges and benefits of respecting ownership and copyright, particularly in digital environments.
    - ■ Digital Sharing - Unplugged Activity

MODULE 5

UNIT 7

END OF COURSE PROJECT

➢ **LESSON 1: End of Course Project**

   ○ **DESCRIPTION:** This project lesson takes students through the process of designing, developing, and showcasing new projects!

   ■ Example Projects
   ■ Create your project

MODULE 6

DIGITAL CITIZENSHIP

➢ **LESSON 1: The Power of Words**

    ○   **DESCRIPTION:** As kids grow, they'll naturally start to communicate more online. But some of what they see could make them feel hurt, sad, angry, or even fearful. Help your students build empathy for others and learn strategies to use when confronted with cyberbullying.

        ■   The Power of Words - Unplugged Activity

MODULE 6

UNIT 2	SPRITES

➢ **LESSON 1: Introducing Sprite Lab**

  ○ **DESCRIPTION:** In this context-setting lesson, students will discuss the role of computers and technology in their lives, focusing on how apps and tools give users choices about how to use them. Students will also explore apps similar to those they'll create themselves later on.

  ■ Video: Introducing Sprite Lab
  ■ Exploration: Sample Apps

➢ **LESSON 2: Making Sprites**

  ○ **DESCRIPTION:** In this skill-building lesson, students will work through a series of programming levels on the computer, finishing with an open-ended "free play" task where they can build whatever they like. Students will write programs and learn about the two concepts at the heart of Sprite Lab: sprites and behaviors.

  ■ Prediction
  ■ Video: How to Make a Sprite
  ■ Skill Building
  ■ Practice
  ■ Free Play: Make a Scene

➢ **LESSON 3: Sprites in Action**

  ○ **DESCRIPTION:** In this skill-building lesson, students will work through a series of programming levels on the computer, finishing with an open-ended "free play" task where they can build whatever they like. Students will write programs that respond to timed events and user input.

  ■ Prediction
  ■ Video: Sprites in Action
  ■ Skill Building
  ■ Practice
  ■ Free Play: Make an Interactive Scene

➢ **LESSON 4: Mini-Project: Virtual Pet**

  ○ **DESCRIPTION:** Students will create an interactive Virtual Pet that looks and behaves how they wish in this mini-project lesson. Students will use Sprite Lab's "Costumes" tool to customize their pet's appearance. They will then use events, behaviors, and other concepts they have learned to bring their project to life.

  ■ Exploration
  ■ Mini-Project: Create a Virtual Pet
  ■ Free Play

MODULE 6

UNIT 3	VARIABLES

➢ **LESSON 1: Blank Space Stories**

- ○ **DESCRIPTION:** In this context-setting lesson, students will use fill-in-the-blank stories (similar to Mad Libs®) as a context for understanding how computers take and store input from a user, then use it later as a program runs.

  - ■ Video: Unplugged Variables in Envelopes

➢ **LESSON 2: Text and Prompts**

- ○ **DESCRIPTION:** In this skill-building lesson, students will get practice with variables in Sprite Lab.

  - ■ Prediction
  - ■ Video: Text and Prompts
  - ■ Skill Building
  - ■ Practice

➢ **LESSON 3: Mini-Project: User Input Programs**

- ○ **DESCRIPTION:** Students will apply their new skills with variables to one of three open-ended mini-projects. Students will explore sample programs, create a plan for their own project, and program it from scratch.

  - ■ Prediction
  - ■ Exploration: Sample Programs
  - ■ Planning
  - ■ Mini-Project: User Input Programs

➢ **LESSON 4: Lots of Sprites**

- ○ **DESCRIPTION:** In this context-setting/skill-building lesson, students will go deeper into Sprite Lab's capabilities and learn how to manage groups of sprites with the same costume.

  - ■ Prediction
  - ■ Video: Lots of Sprites
  - ■ Skill Building
  - ■ Practice
  - ■ Free Play

MODULE 6

VARIABLES

➢ **LESSON 5: Counting with Variables**

  ○ **DESCRIPTION:** In this skill-building lesson, students will use variables to track a value that changes over time, like a counter. This lesson also includes a short mini-project in which students create a simple game.

  ■ Prediction
  ■ Skill Building
  ■ Exploration: Clicker Game
  ■ Mini-Project: Clicker Game

➢ **LESSON 6: Mini-Project: Collector Game**

  ○ **DESCRIPTION:** In this mini-project lesson, students will create a customized "collector game", in which the user moves a sprite around to collect objects.

  ■ Exploration: Sample Programs
  ■ Mini-Project: Collector Game

MODULE 6

UNIT 4	DATA AND SIMULATIONS

➢ **LESSON 1: Simulating Experiments**

  ○ **DESCRIPTION:** In this context-setting lesson, students will run and collect data from a simple simulation in Sprite Lab. After running the simulation multiple times, students will have an opportunity to predict how changing a variable in the simulation might impact the outcome and test that hypothesis.

  ■ Run a simulation
  ■ Modify simulation variables
  ■ Customize

➢ **LESSON 2: Outbreak**

  ○ **DESCRIPTION:** This lesson combines skill-building around events with a mini-project where students get to build their own computer simulation in Sprite Lab. Students will study the simulation to understand how quickly a virus can spread and what can be done to slow it down.

  ■ Welcome to Monster Town
  ■ Video: Outbreak Simulator: Introduction
  ■ Skill Building
  ■ Video: Outbreak Simulator: Events
  ■ Skill Building
  ■ Video: Outbreak Simulator: Thinking Like a Scientist
  ■ Learning from Simulations
  ■ Mini-Project: Outbreak Simulator
  ■ Video: Outbreak Simulator: Free Play
  ■ Mini-Project: Outbreak Simulator

➢ **LESSON 3: AI For Oceans**

  ○ **DESCRIPTION:** In this exploratory lesson, students will train a machine learning model by classifying fish and other objects.

  ■ Video: AI: What is Machine Learning?
  ■ Train AI to Clean the Ocean
  ■ Video: Training Data & Bias
  ■ Using Training Data
  ■ Video: Impacts on Society
  ■ Teach A.I. a new word

➢ **LESSON 4: The Internet**

  ○ **DESCRIPTION:** Students will pretend to flow through the internet while learning about connections, URLs, IP Addresses, and DNS in this exploratory lesson.

  ■ The Internet - Unplugged Activity

MODULE 6

UNIT 5

END OF COURSE PROJECT

➢ **LESSON 1: End of Course Project**

    ○ **DESCRIPTION:** This project lesson takes students through the process of designing, developing, and showcasing new projects!

        ■ Example projects
        ■ Create your project