Unit 3: Coding for Third Graders

Content Area: **English Language Arts**
Course(s):
Time Period: **Trimester 2**
Length: **8-10 sessions**
Status: **Published**

Brief Summary of Unit

Students will be introduced to coding and computational thinking through age appropriate websites/manipulatives. Computational thinking is problem solving in an efficient way. It can include knowing how and when to use computing tools, knowing what steps you need to take to solve a problem, and logically organizing and analyzing data. In addition, students apply the knowledge they have learned in this unit through the programming of various coding robots such as Dot, Dash, Botley and Ozobots. Additional enrichment and continued coding skills are always offered activities through monthly and seasonal choice boards.

This unit is designed to be part of a developmental progression across grade levels and make interdisciplinary connections across content areas including physical and social sciences, technology, career readiness, cultural awareness, and global citizenship. During this course, students are provided with opportunities to develop skills that pertain to a variety of careers.

Revision Date: July 2023

Standards

This unit challenges students to locate, evaluate, and use information effectively. Information literacy includes, but is not limited to, digital, visual, media, textual, and technological literacy. Lessons may include critical thinking and using information resources as well as the social and ethical issues surrounding the use of information.

The identified standards reflect a developmental progression across grades/ levels and make interdisciplinary connections across content areas including social sciences, technology, career readiness, cultural awareness and global citizenship. The standards that follow are relevant to this course in addition to the associated content-based standards listed below.

LA.SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
LA.SL.5.1.D	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
LA.SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).
LA.SL.5.3	Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.

I	Inquire: Build new knowledge by inquiring, thinking critically, identifying problems, and developing strategies for solving problems.
I.A.1	Formulating questions about a personal interest or a curricular topic.
I.A.2	Recalling prior and background knowledge as context for new meaning.
I.C	Learners adapt, communicate, and exchange learning products with others in a cycle that includes:
I.C.1	Interacting with content presented by others.
I.C.2	Providing constructive feedback.
I.C.3	Acting on feedback to improve.
I.D	Learners participate in an ongoing inquiry-based process by:
I.D.1	Continually seeking knowledge.
I.D.2	Engaging in sustained inquiry.
I.D.3	Enacting new understanding through real-world connections.
I.D.4	Using reflection to guide informed decisions.
V	Explore: Discover and innovate in a growth mindset developed through experience and reflection.
V.A.2	Reflecting and questioning assumptions and possible misconceptions
V.B	Learners construct new knowledge by:
V.B.2	Persisting through self-directed pursuits by tinkering and making.
V.C	Learners engage with the learning community by:
V.C.1	Expressing curiosity about a topic of personal interest or curricular relevance
V.C.3	Collaboratively identifying innovative solutions to a challenge or problem
TECH.8.1.2.A.3	Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each.
TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.2.5	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Essential Questions/Enduring Understandings

- ● How can I use computational thinking to solve simple problems?
- ● What is computational thinking?
- ● What vocabulary words are used in computer programming?
- ● Why is it important to use coding vocabulary appropriately?
- ● How can I program a coding robot to perform a simple task?
- ● How does computational thinking allow me to solve simple problems?

Students Will Know/Students Will Be Skilled At

- Programming a coding robot to successfully perform a variety of simple tasks.
- Programming various lessons through a coding course on code.org.
- Simple problems may be solved with computational thinking
- To apply existing knowledge to generate new ideas
- Utilizing age appropriate coding activities to build an understanding of the basics of programming.
- Utilizing coding terms appropriately and regularly during class discussions and group work.

Evidence/Performance Tasks

Students demonstrate differentiated proficiency through both formative and summative assessments in the classroom. Based on individual student readiness and performance, assessments can be implemented as formative and/or summative.

Developmental progression across years in media is evidenced through benchmark assessments as part of the media specialist's Student Growth Objective (SGO). Follow up diagnostic assessments are used to target skill remediation. Student proficiency allows for additional or alternative assessment based on demonstration or absence of skill.

The performance tasks listed below are examples of the types of assessments teachers may use in the classroom and the data collected by the district to track student progress.

- Benchmark: Students demonstrate proficient and appropriate use of coding vocabulary terms through an SGO assessment in the form of a Google Form Quiz.
- Formative: Students independently utilize introductory games/tools that teach the elements of basic coding.
- Formative: Students independently code various lessons utilizing code.org.
- Summative: Students work collaboratively in groups to navigate coding robots through an obstacle course/maze.

Learning Plan

Media Specialists may personalize instruction during this unit and address the distinct learning needs, interests, aspirations, or cultural backgrounds of individual students.

Students are exposed to STEM-related activities during this unit allowing them to experience varied disciplines including science and mathematics.

Media Specialists at the elementary level design their own unique lesson plans in order to incorporate the essential questions provided in this unit. The order in which this information is presented is dependent upon the variables specific to each elementary school community. For example, students may be called to the carpet for a lesson followed by guided practice, then independent practice. After the lesson, students will

check out books. Library Media time ends with an electronic story or students going to a makerspace station.

Third grade students will review and continue to build coding and computational thinking through age appropriate websites/manipulatives. Computational thinking is problem solving in an efficient way. It can include knowing how and when to use computing tools, knowing what steps you need to take to solve a problem, and logically organizing and analyzing data. This unit incorporates code.org curriculum for second grade and various coding robots appropriate for grade level.

Code.org coding lessons should be completed in order following the progresson of Course A to Course F. Grade 3 should ideally focus on the lessons in Course C.

Course C Lesson Plans can be found at the following link: https://studio.code.org/s/courseb-2021?section_id=3420260https://studio.code.org/s/coursec-2023?section_id=4625822&viewAs=Instructor. During this unit, students usually do lessons 2-7 in Code.org. See below for description and lesson plans.

Course C (2023) Overview:

We developed Course C for students in second and third grades. Students will create programs with sequencing, loops, and events. They will investigate problem-solving techniques and develop strategies for building positive communities both online and offline. By the end of the course, students will create interactive games that they can share.

Lesson 1: Putting a STOP to Online Meanness - 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.

Lesson 2 : Sequencing - This unplugged lesson brings the class together as a team with a simple task to complete: get a "robot" to stack cups in a specific design. This activity lays the groundwork for the programming that students will do throughout the course as they learn the importance of defining a clearly communicated algorithm.

Lesson 3 : Programming with Angry Birds - In this lesson, students will develop programming and debugging skills on a computer platform. The block-based format of these puzzles help students learn about sequence and concepts, without having to worry about perfecting syntax.

Lesson 4 : Debugging in Maze - 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. Students in your class might become frustrated with this lesson because of the essence of debugging. Debugging is a concept that is very important to computer programming. Computer scientists have to get really good at facing the bugs in their own programs. Debugging forces the students to recognize problems and overcome them while building critical thinking and problem solving skills.

Lesson 5 : Collecting Treasure with Laurel - 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. In this lesson, students will be practicing their programming skills using a new character, Laurel the Adventurer. When someone starts programming they piece together instructions in a specific order using something that a machine can read. Through the use of programming, students will develop an understanding of how a computer navigates instructions and order. Using a new character with a different puzzle objective will help students widen their scope of experience with sequencing and algorithms in programming.

Lesson 6 : Creating Art with Code - In this skill-building lesson, students will take control of the Artist to complete drawings on the screen. Building off of the students' previous experience with sequencing, this lesson will work to inspire more creativity with coding. The purpose of this lesson is to solidify knowledge on sequencing by introducing new blocks and goals. In this case, students learn more about pixels and angles using the new blocks, while still practicing their sequencing skills. Also, students will be able to visualize new goals such as coding the Artist to draw a square.

Lesson 7 : My Loopy Robotic Friends Jr. - This context-setting lesson builds on the initial "My Robotic Friends" activity, featuring larger and more complicated designs. This lesson serves as a reintroduction to loops, using the now familiar set of "robot" programming instructions. Students will develop critical thinking skills by looking for patterns of repetition in the movements of classmates and determining how to simplify those repeated patterns using loops.

Lesson 8 : Loops wit Rey and BB-8 - This skill-building lesson has students using loops to help BB-8 efficiently traverse a maze. In this lesson, students will be learning more about loops and how to implement them in Blockly code. Using loops is an important skill in programming because manually repeating commands is tedious and inefficient. With the Code.org puzzles, students will learn to add instructions to existing loops, gather repeated code into loops, and recognize patterns that need to be looped. It should be noted that students will face puzzles with many different solutions. This will open up discussions on the various ways to solve puzzles with advantages and disadvantages to each approach.

Lesson 9 : Harvesting Crops with Loops - Students loop new actions to help the harvester collect multiple veggies growing in large bunches in this skill-building lesson. In this lesson, students will use loops to repeat actions like harvesting pumpkins. New patterns will emerge and students will use creativity and logical thinking to determine what code needs to be repeated and how many times.

Lesson 10 : Mini-Project Sticker Art - This mini-project lesson builds on the understanding of loops from previous lessons. Students will create unique artwork with the Artist.This series highlights the power of loops with creative and personal designs. Offered as a project-backed sequence, this progression will allow students to build on top of their own work and create amazing artifacts.

- Demonstrate Botley robots prior to use
- Demonstrate how to access age appropriate pre-selected online resources
- Demonstrate Ozobot robots prior to use
- Mini lessons may include: Demonstration/modeling of how to safely use tools such as Dash and Dot robots, Ozobots, ipads, laptops How to access appropriate online sites/applications Guided practice of online coding tutorials
- Preview the essential questions and connect to learning throughout the unit.
- Refer to visual aids displayed in library media center
- Review Dash and Dot robots prior to use
- Utilize age appropriate coding tutorials
- Vocabulary to introduce: program, algorithm, looping, functions,
- Within the library media center have materials available for inquiry/ creative activities

Materials

The materials used in this course allow for integration of a variety of instructional, enrichment, and intervention materials that support student learners at all levels in the school and home environments. Associated web content and media sources are infused into the unit as applicable and available.

Code.org and specific robots earmarked for each grade are core materials used by all library media specialists across district.

Suggested Supplemental Resources:

- https://hourofcode.com/us/learn (Hour of Code website)
- https://code.org/educate/curriculum/elementary-school (lesson plans)
- https://www.scratchjr.org (Scratch Jr application)
- Coding Choice Board for K-3
- Coding Choice Board for 3-6
- https://www.makewonder.com/ (Dash and Dot)
- Introduction to Dot (Google Slides)
- Introduction to Dash (Google Slides)
- How to Code a Sand Castle (Google Slides)
- Make a Recipe (Google Slides)
- Debugging (Google Slides)
- Ozobots
- Dot Robots
- Dash Robots
- Botley Robots

- Samsung Tablets to program the robots
- SmartPanel

- Age appropriate online websites
- Age appropriate websites/applications
- Botley Coding Robot
- Computer technology (Ipads/Laptops)
- Dot and Dash Robots
- Interactive board technology
- Presentation software
- Visual aids

Strategies for Accommodation and Modification

Content specific accomodations and modifications as well as Career Ready Practices are listed here for all students, including: Special Education, English Language Learners, At Risk of School Failure, Gifted and Talented, Students with 504.