Unit 06: Coding for Second Graders

Content Area: **English Language Arts**
Course(s):
Time Period: **Trimester 2**
Length: **6-9 sessions**
Status: **Published**

Brief Summary of Unit

Second 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 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: June 2021

Standards

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.W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
LA.SL.2.6	Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
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.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	Learners develop and satisfy personal curiosity by:
V.A.3	Engaging in inquiry-based processes for personal growth.
V.B	Learners construct new knowledge by:
V.B.1	Problem solving through cycles of design, implementation, and reflection.
V.B.2	Persisting through self-directed pursuits by tinkering and making.
V.D	Learners develop through experience and reflection by:
V.D.1	Iteratively responding to challenges.
V.D.3	Open-mindedly accepting feedback for positive and constructive growth.
II.C.1	Engaging in informed conversation and active debate.
II.C.2	Contributing to discussions in which multiple viewpoints on a topic are expressed.
VI.D	Learners engage with information to extend personal learning by:
VI.D.1	Personalizing their use of information and information technologies.
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they

	thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
III	Collaborate: Work effectively with others to broaden perspectives and work toward common goals.
III.A.2	Developing new understandings through engagement in a learning group.
III.A.3	Deciding to solve problems informed by group interaction.
III.C	Learners work productively with others to solve problems by:
III.C.1	Soliciting and responding to feedback from others.
III.C.2	Involving diverse perspectives in their own inquiry processes.
III.D	Learners actively participate with others in learning situations by:
III.D.1	Actively contributing to group discussions.
TECH.8.1.2	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.8.1.2.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
TECH.8.1.2.A.4	Demonstrate developmentally appropriate navigation skills in virtual environments (i.e., games, museums).
TECH.8.1.2.A.CS1	Understand and use technology systems.
TECH.8.1.2.A.CS2	Select and use applications effectively and productively.
TECH.8.1.2.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.2.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.2.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.2.C.1	Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.
TECH.8.1.2.E.CS1	Plan strategies to guide inquiry
TECH.8.1.2.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.2.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.2.2	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.
TECH.8.2.2.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.2.A.CS2	The core concepts of technology.
TECH.8.2.2.A.CS3	The relationships among technologies and the connections between technology and other fields of study.

TECH.8.2.2.B.1	Identify how technology impacts or improves life.
TECH.8.2.2.B.4	Identify how the ways people live and work has changed because of technology.
TECH.8.2.2.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
TECH.8.2.2.C.CS3	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving
TECH.8.2.2.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.2.E.1	List and demonstrate the steps to an everyday task.
TECH.8.2.2.E.3	Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).
TECH.8.2.2.E.4	Debug an algorithm (i.e., correct an error).
TECH.8.2.2.E.5	Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).
TECH.8.2.2.E.CS1	Computational thinking and computer programming as tools used in design and engineering.
TECH.9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
TECH.9.4.2.TL.4	Navigate a virtual space to build context and describe the visual content.
TECH.9.4.2.TL.7	Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).

Essential Questions/Enduring Understandings

- How can I program a coding robot to perform a simple task?
- How can I use computational thinking to solve simple problems?
- How does computational thinking allows me 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?

Students Will Know/Students Will Be Skilled At

- Programming a coding robot to successfully perform a variety of simple tasks.
- Programming various lessons through 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 discussion 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.
- 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.

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Code.org coding lessons should be completed in order following the progresson of Course A to Course F. Grade 2 should ideally focus on the lessons in Course B.

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

Course B (2021) Overview:

While the concepts in Course B parallel those in Course A, students learn more sophisticated unplugged activities and work through a greater variety of puzzles. Students will learn the basics of programming, collaboration techniques, investigation and critical thinking skills, persistence in the face of difficulty, and internet safety. At the end of this course, students create games in the Play Lab programming environment.

Lesson 1: Digital Trails -This lesson is used during digital citizenship unit.

Lesson 2: Move It, Move It-Unplugged Lesson

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

Lesson 3: Sequencing with Angry Birds

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.

Lesson 4: Programming with Angry Birds

In this skill-building lesson, students will continue to develop sequential algorithms.

Lesson 5: Programming with Harvester

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.

Lesson 6: Getting Loopy

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.

Lesson 7: Loops with Harvester

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

- Demonstrate Dash and Dot robots prior to use.
- Demonstrate how to access age appropriate pre-selected online resources.
- Mini lessons may include: Demonstration/modeling of how to safely use tools such as Dash and Dot robots, ipads, laptops, How to access appropriate online sites/applications such as Code.org, and 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.
- Utilize age appropriate coding tutorials.
- Vocabulary to introduce: program, algorithm, looping.
- 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)
- 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)

- Age appropriate online websites
- Age appropriate websites/applications
- Computer technology (Ipads/Tablets/Chromebooks)
- Dash and Dot robots
- Interactive board technology (SmartPanel)
- Presentation software
- Visual aids

Suggested Strategies for Accommodations and Modifications

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.