ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

Pond Road Middle School STEM

Introduction to Coding

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BOARD OF EDUCATION INITIAL ADOPTION DATE: 9/27/22

Course Philosophy

The internet, programming, data & analysis, and computing systems are increasingly relevant topics in our demanding technological society. 'Introduction to Coding' is a comprehensive quarter class focused on important ideas that are central to computing and have lasting value beyond the classroom.

Course Description

This course will provide students with opportunities to explore computer sciences, web development, and creating programmatic images and animations. Students will also develop their critical thinking skills, learn about the importance of data to solve problems, and how computers can be used to help this process. With the help of computer based technologies, students will learn to engage with computer science as a medium for creativity, communication and solving real world problems.

Core and Supplemental Instructional Materials

Core Materials	Supplemental Materials
• Code.org	• Teacher materials are provided within the website for each unit and lesson.

Robbinsville Public Schools
Scope, Sequence, Pacing and Activities

Intro to Coding 6th-8th Grades

Unit Title	Unit Understandings and Goals	Standards Included	Recommended Duration/ Pacing	Activities www.code.org
Unit 1: Problem Solving and Computing	Advancements in computing technology can change individuals' behaviors. Society is faced with trade-offs due to the increasing globalization and automation that computing brings. Protocols, packets, and addressing are the key components for reliable delivery of information across networks. The study of human–computer interaction can improve the design of devices and extend the abilities of humans. Software and hardware determine a computing system's capability to store and process information. The design or selection of a computing system involves multiple considerations and potential trade-offs. Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.	8.1.8.IC.1 8.1.8.IC.2 8.1.8.NI.2 8.1.8.CS.1 8.1.8.CS.2 8.1.8.CS.3 8.1.8.CS.4	Two Weeks	Chapter 1 Lesson 2: The problem-solving process - brainstorm different types of problems they encounter in everyday life Chapter 2 Lesson 4: What is a computer? picture sort in groups. Define & redefine 'computer' Chapter 2 Lesson 5: Input & Output - solve thinking problem Determine how Apps input and output information Chapter 2 Lesson 6: Processing - conditionals, searching, counting and comparing. Identify which apps use different types of processing Chapter 2 Lesson 7: Storage - identify important information that should be stored. End lesson with reflection about how storage could be used. Chapter 2 Lesson 8: Propose an App (Group Work)
Unit 2: Web Development	People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.DA.1 8.1.8.DA.2 8.1.8.DA.3 8.1.8.DA.4 8.1.8.DA.5 8.1.8.DA.6	Four Weeks	Chapter 1 Lesson 2: Intro to HTML - WebLab experiment, introduction to HTML tags Chapter 1 Lesson 3: Headings - work in pairs to structure text on web pages, work together on debugging problems

	Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it. The purpose of cleaning data is to remove errors and make it easier for computers to process. Computer models can be used to simulate events, examine theories and inferences, or make predictions.			Chapter 1 Lesson 5: Digital Footprint - discuss the sharing of personal information Chapter 1 Lesson 6: Styling Text with CSS - learn syntax for CSS rule-sets Chapter 1 Lesson 8: Intellectual Property - discuss copyright Chapter 1 Lesson 9: Using Images - consider ethical implications Chapter 1 Lesson 13: Project - Personal Web Page - Prepare and plan webpage Chapter 2 Lesson 14: Websites for a Purpose - investigate websites that serve different purposes Chapter 2 Lesson 15: Team Problem Solving - Brainstorm features of a site they would like to create. Make a plan. Chapter 2 Lesson 16: Sources & Research - Finding trustworthy information Chapter 2 Lesson 17: CSS Classes - create classes to better control appearance of websites Chapter 2 Lesson 18: Planning a Multi-Page Site - work in teams to sketch each page Chapter 2 Lesson 19: Linking Pages - Use WebLab to make links for navigation Chapter 2 Lesson 20: Project Website for a Purpose - teams code pages & peer review when complete
Unit 3: Interactive Animations and Games	Individuals design algorithms that are reusable in many situations. Algorithms that are readable are easier to follow, test, and debug. Programmers create variables to store data values of different types and perform appropriate operations on their values. Control structures are selected and combined in programs to solve more complex problems.	8.1.8.AP.2 8.1.8.AP.3 8.1.8.AP.4 8.1.8.AP.5 8.1.8.AP.6 8.1.8.AP.7 8.1.8.AP.8 8.1.8.AP.9	Two Weeks	Chapter 1 Lesson 1: Programming for Entertainment - Introduction Chapter 1 Lesson 2: Plotting Shapes - communicate position using a grid Chapter 1 Lesson 3: Drawing in Game Lab - sequencing and debugging Chapter 1 Lesson 4: Shapes and Parameters - draw with ellipse(), rect(), background() Chapter 1 Lesson 5: Variables - learn purpose and use of variables Chapter 1 Lesson 6: Random Numbers - create behaviors in programs

	Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability. Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.			Chapter 1 Lesson 7: Sprites - assign images and increase complexity Chapter 1 Lesson 8: Sprite Properties - change appearance of sprites Chapter 1 Lesson 9: Text - introduce text commands in Game Lab Chapter 1 Lesson 10: Project - Captioned Scenes - share creations
Unit 4: Data & Society	Individuals design algorithms that are reusable in many situations. Algorithms that are readable are easier to follow, test, and debug. Programmers create variables to store data values of different types and perform appropriate operations on their values. Control structures are selected and combined in programs to solve more complex problems. Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability. Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.	8.1.8.AP.2 8.1.8.AP.3 8.1.8.AP.4 8.1.8.AP.5 8.1.8.AP.6 8.1.8.AP.7 8.1.8.AP.8 8.1.8.AP.9 8.1.8.DA.1 8.1.8.DA.2 8.1.8.DA.3 8.1.8.DA.4 8.1.8.DA.5 8.1.8.DA.6 8.1.8.NI.3 8.1.8.NI.4	Two Weeks	Lesson 1: Representation Matters Lesson 2: Patterns and Representation Lesson 3: ASCII and Binary Representation Lesson 4: Representing Images - binary patterns Lesson 5: Representing Numbers - binary numbers Lesson 6: Combining Representations - Decode information in a record with ASCII, binary number and images Lesson 7: Keeping Data Secret - binary encryption Lesson 8: Create a Representation - design a structure with binary systems

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5th Grade Unit Title	Unit Understandings and Goals	Standards Included	Recommended Duration/ Pacing	Activities www.code.org
CS Fundamentals Express Course 2022	Individuals design algorithms that are reusable in many situations. Algorithms that are readable are easier to follow, test, and debug. Programmers create variables to store data values of different types and perform appropriate operations on their values. Control structures are selected and combined in programs to solve more complex problems.	8.1.8.AP.2 8.1.8.AP.3 8.1.8.AP.4 8.1.8.AP.5 8.1.8.AP.6 8.1.8.AP.7 8.1.8.AP.8 8.1.8.AP.9 8.1.8.DA.1 8.1.8.DA.2 8.1.8.DA.3 8.1.8.DA.4	9 Weeks Add lessons as needed: Scratch Programing or CSFirst with Google	Lesson 1: Programming with Angry Birds - sequential algorithms Lesson 2: Debugging in Maze - identify errors Lesson 3: Collecting Treasure with Laurel- sequential algorithms Lesson 4: Creating Art with Code - skill-building Lesson 5: Swimming Fish - animated scene

	Programs use procedures to organize code and hide implementation details. Procedures can be repurposed in new programs. Defining parameters for procedures can generalize behavior and increase reusability. Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community. People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data. Data is represented in many formats. Software tools translate the low-level representation of bits into a form understandable by individuals. Data is organized and accessible based on the application used to store it. The purpose of cleaning data is to remove errors and make it easier for computers to process. Computer models can be used to simulate events, examine theories and inferences, or make predictions.	8.1.8.DA.5 8.1.8.DA.6 8.1.8.NI.3 8.1.8.NI.4		Lesson 6: Making Sprites - sprites and behaviors
				Lesson 7: Sprites in Action - timed events
				Lesson 8: Virtual Pet - use events behaviors and other concepts
				Lesson 9: Dance Party - program interactive dance party
				Lesson 10: Loops - traverse a maze
				Lesson 11: Sticker Art - mini project
				Lesson 12: Nested Loops - program loops inside another loop
				Lesson 13: Mini Project - use angles to create snowflake designs
				Lesson 14: Skill Building - conditionals
				Lesson 15: If/Else - write code that functions differently
				Lesson 16: Loops in Farmer - solve puzzles
				Lesson 17: Conditionals - practice content
				Lesson 18: Loops - build program that has main character repeat actions
				Lesson 19: Conditionals - if/else statements with flexible code
				Lesson 20: Functions - skill building
				Lesson 21: Functions - conditionals with functions
				Lesson 22: Functions with Artist

				Lesson 23: Text & Prompts - variables in Sprite Lab
				Lesson 24: Counting with Variables - track values
				Lesson 25: Variables with Artist - repetitive designs