Grade 3 Science
Technology Integrated Unit of Study
Learning To Code; Coding To Learn

Title of Unit	Learning To Code;Coding To Learn	**Grade Level**	3
Curriculum Area	Science and Technology	**Time Frame**	10 days
Developed By	WTS		

Identify Desired Results (Stage 1)

Content Standards

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.

9.3.IT‑PRG.6 Program a computer application using the appropriate programming language.

9.3.12.AR‑VIS.2 Analyze how the application of visual arts elements and principles of design communicate and express ideas.

9.3.12.AR‑VIS.3 Analyze and create **two** and three‑dimensional visual art forms using various media.

5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns.

Career Readiness, Life Literacies, and Key Skills

Creativity and Innovation

Core Ideas	Performance Expectations
Brainstorming can create new, innovative ideas.	9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

2020 NJSLS-Computer Science & Design Thinking

Networks and the Internet

Computer networks can be used to connect individuals to other individuals, places, information, and ideas. The Internet enables individuals to connect with others worldwide.

• 8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.

• 8.1.2.NI.2: Describe how the Internet enables individuals to connect with others worldwide.

Data & Analysis

Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.

8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device.

Data can be used to make predictions about the world.

• 8.1.2.DA.3: Identify and describe patterns in data visualizations.

• 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Impacts of Computing

Core Idea	Performance Expectations
Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).	8.1.2.IC.1: Compare how individuals live and work before and after the implementation of new computing technology.

Interdisciplinary Connections
ELA RI 1.1: Ask and answer questions about key details in a text. RI 1.2: Identify the main topic and retell key details of a text. RI 1.3: Describe the connection between pieces of information in a text. RI 1.4: Ask and answer questions to help determine or clarify the meaning of words and phrases in a text. RI 1.5: Know and use text features. RI 1.6: Distinguish between information provided by illustrations and by words. RI 1.7: Use illustrations and details to describe its key ideas. RI 1.8: Identify the reasons an author gives to support points. RI 1.9: Identify similarities in and differences between texts on the same topic. W 1.5: Strengthen writing by revising and editing. W 1.7: Participate in shared research and writing projects. SL 1.1: Participate in collaborative conversations. SL 1.3: Ask and answer questions about what a speaker says. SL 1.5: Add drawings or other visual displays to clarify ideas. L 1.4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases. Mathematics Represent and solve problems involving addition and subtraction. MA 1.1.OA.A Tell and Write Time MA 1.1.MD.B

Enduring Understandings	**Essential Questions**	
Students will understand that…	**Overarching**	**Topical**
They can define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	How to design a 2D animation using code? Why code?	What is failure? What is struggle?

They need plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. That in order to program a computer application they need to use the appropriate programming language. The concepts of and demonstrate positive digital citizen practices. Digital citizenship contract	What would the world be like without code? What are the aspects of positive digital citizenship? Why is struggle and failure okay?	What skills are involved in coding? What is code? What is a variable? What did you learn about yourself through coding?
Related Misconceptions (False; Truth)		
Coding is only for adults;people can code at various ages. Coding is difficult; there are tools which help break down the process		
Knowledge (Declarative) Students will know…	**Skills (Procedural)** Students will be able to…	
Definition of 2D versus 3D The coding language Variable Block code Positive digital citizen	Create a computer program using block coding Design an animation or visual Demonstrate positive digital citizenship Analyze different features of code to create 2D animations	
Assessment Evidence (Stage 2)		
Performance Task Description -		
	Summative: Produce an animation 2D visual through code. Rubric A signed Digital Citizen Contract **Formative**: Notebook entry-open ended response-What did you learn about yourself through coding?	
Suggested Other Evidence		
Teacher Observation Checklists		

Resources
Learning to Program a Computer Five rules for good digital citizenship Digital citizenship contract Rubric for Scratch Projects EDP template Teacher instructional video for classroom setup Teacher instructional video lesson - part 2 Students watch the introductory video about coding. Scratch website Differentiate as needed- https://www.scratchjr.org/ (may need to upload the chromebook extension) Scratch for Educators - click on Ted Talk Video How to video for teachers - part 1 How to video for teachers - part 2 Tutorial for Hello World Project SEP Student Record Sheet ½ sheet (For use in the student notebook) CCC ½ sheet for student notebook

Learning Plan Guide (Stage 3)	
Where are your students headed? Where have they been? How will you make sure the students know where they are going?	Teacher instructional video for classroom setup. Teacher instructional video lesson - part 2 Students watch the introductory video about coding.
How will you hook students at the beginning of the unit?What phenomena or engineering design problem will you use?	Have students define what is coding? Brainstorm careers that involve coding. Have students think about the difference between **learning to code and coding to learn**. Relate this to learning to read and reading to learn.
What events will help students experience and explore the big idea and questions in the unit? How will you equip them with needed skills and knowledge?	Teacher needs to lead a discussion about failure and struggle with the students. Teacher needs to lead a discussion about the importance of positive digital citizenship.
How will you cause students to reflect and rethink? How will you guide them in rehearsing, revising, and refining their work?	Teacher will share the concepts of being a positive digital citizen with the students. Students will sign a contract outlining their commitment to being a positive digital citizen. Teacher will lead the whole class in creating Hello World animation by using block code. Next, student will create their own animation using block code. When learning to code students will be asked to

	constantly revise and reflect on their work in order to refine their final animation. Students will share their animations and comment on each others using the concepts of being a positive digital citizen.
How will you help students to exhibit and self-evaluate their growing skills, knowledge, and understanding throughout the unit?	Students will answer the essential question-What did you learn about yourself through coding?
How will you tailor and otherwise personalize the learning plan to optimize the engagement and effectiveness of ALL students, without compromising the goals of the unit?	Refer to the accommodations and modifications of the curriculum in the Science Curriculum Table of Contents.
How will you organize and sequence the learning activities to optimize the engagement and achievement of ALL students?	Students will create the Hello World project with their guidance from their teacher. Students will be able to code independently for the rest of the school year.

#	Lesson Title	Lesson Activities	NJ Student Learning Standards	Resources
	For teachers use only- How to make an educator account	1. Teacher account, request account ➔ Click teacher account ➔ The request an account (this may take up to one day to receive approval) 2. Video tutorial on how to make a class, add students to your class by creating a link all your students can access	3-5-ETS1-1 3-5-ETS1-3 9.3.IT-PRG.6 9.3.IT.4	Scratch website information for educators - Ted Talk video How to video for teachers - part 1 How to video for teachers - part 2
1	**Being a positive digital citizen in action**	Teacher leads the class discussion; students and parents sign a positive digital citizen contact.	9.3.IT.4	Digital contract
2	**Hello World Project**	1. Making your first project as a class- Hello World 2. Login and click create 3. Tutorial for Hello World Project	3-5-ETS1-1 3-5-ETS1-3 9.3.IT-PRG.6 9.3.IT.4	

3	**Scratch Starter Projects**	1. Using the Scratch website, have students use the starter projects to learn more coding techniques	3-5-ETS1-1 3-5-ETS1-3 9.3.IT‑PRG.6 9.3.IT.4	Scratch starter projects
4	**Student generated Scratch project**	Students will create their own animation based on the scripts, costumes and sounds when learning to block code.	3-5-ETS1-1 3-5-ETS1-3 9.3.IT‑PRG.6 9.3.IT.4 5.OA.B.3	Scratch Rubric
5.	**Share project**	Students share their original Scratch project with the class. Using concepts of being a positive digital citizen, students share comments with each other about the quality of each other's projects. Finally, students will write a reflection in their science notebooks to answer the open ended question.	CRP4. 9.3.IT.4	

From: Wiggins, Grant and J. Mc Tighe. (1998). *Understanding by Design*, Association for Supervision and Curriculum Development