Wall Township Public Schools	Board Approval Date: 8/19/2025
Course Title: Grade 1 - STEM	
Course Description: This technology curriculum for Grade 1 introduces students to foundational concepts in computer science, engineering design, and scientific inquiry through engaging, hands-on experiences. Using platforms such as Code.org, SAM Labs, and Mystery Science, students learn how to think computationally, design and build solutions, and apply problem-solving strategies in real-world contexts. Throughout the course, students explore how computers work, practice creating algorithms, investigate cause and effect through interactive science lessons, and build projects using physical computing tools. Emphasis is placed on fostering curiosity, creativity, and collaboration. By the end of the course, students will be able to plan and create simple computing projects, demonstrate understanding of technology systems, and present their ideas with confidence—laying the groundwork for future STEM learning.	

New Jersey Student Learning Standards

Disciplinary Concepts and Core Ideas:

Computing Systems: People interact with a wide variety of computing devices that collect, store, analyze, and act upon information in ways that can affect human capabilities both positively and negatively. The physical components (hardware) and instructions (software) that make up a computing system communicate and process information in digital form.

Networks and the Internet: Computing devices typically do not operate in isolation. Networks connect computing devices to share information and resources and are an increasingly integral part of computing. Networks and communication systems provide greater connectivity in the computing world.

Data & Analysis: Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, so the need to process data effectively is increasingly important. Data is collected and stored so that it can be analyzed to better understand the world and make more accurate predictions.

Algorithms & Programming: An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicInteraction of Technology and Humans Societies influence technological development. Societies are characterized by common elements such as shared values, differentiated roles, and cultural norms, as well as by entities such as community institutions, organizations, and businesses. Interaction of Technology and Humans concerns the ways society drives the improvement and creation of new technologies, and how technologies both serve and change society.

Engineering Design: People design for enjoyment and to solve problems, extend human capabilities, satisfy needs and wants, and improve the human condition. Engineering Design, a systematic approach to creating solutions to technological problems and finding ways to meet people's needs and desires, allows for the effective and efficient development of products and systems.

Nature of Technology: Human population, patterns and movement focus on the size, composition, distribution, and movement of human populations and how they are fundamental and active features on Earth's surface. This includes understanding that the expansion and redistribution of the human population affects patterns of settlement, environmental changes, and resource use. Patterns and movements of population also relate to physical phenomena including climate variability, landforms, and locations of various natural hazards and their effects on population size, composition, and distribution.

Effects of Technology on the Natural World: Many of engineering and technology's impacts on society and the environment are widely regarded as desirable. However, other impacts are regarded as less desirable. Effects of Technology on the Natural World concerns the positive and negative ways that technologies affect the natural world.

Ethics & Culture: Ethics and Culture concerns the profound effects that technologies have on people, how those effects can widen or narrow disparities, and the responsibility that people have for the societal consequences of their technological decisions.

Course Sequence & Pacing

Unit Title	**Lesson:**
Unit 1: Introduction to Computers and Algorithms	1-4
Unit 2: Exploring Patterns and Problem Solving	5-8
Unit 3: Designing with Code and Engineering Concepts	9-13
Unit 4: Building, Testing, and Sharing Creations	14-18

Unit 1

Desired Results

Unit 1 Title: Introduction to Computers and Algorithms

Unit Summary: In this unit students will be introduced to computers, basic programming concepts, and simple sequencing using unplugged and digital activities.

Learning Standards

8.1.1.CS.1 - Model how computing devices connect to other components to form a system.
8.1.2.AP.1 - Model daily processes by creating and following algorithms to complete tasks.
8.1.2.AP.2 - Model the way programs store and manipulate data by using numbers or other symbols to represent information.
8.2.2.ED.1 - Communicate the function of a product or device.
8.2.2.ED.2 - Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
8.2.2.ETW.1 - Classify products as resulting from nature or produced as a result of technology.
8.2.2.ETW.4 - Explain how the disposal of or resung a product affects the local and global environment.

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills

9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem

9.4.2.DC.1: Explain differences between ownership and sharing of information.

Interdisciplinary Connections

NJSLS - ELA 2023

SL.PE.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups

SL.II.1.2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

RI.CR.1.1. Ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how).

NJSLS - Math 2023

1.M.B.3 – Order and compare events in time using sequencing

NJSLS - SCIENCE 2020

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

<table>
<tr><th colspan="3">Learning Targets</th></tr>
<tr><td colspan="2">Unit Essential Questions:
1. What is a computer and how does it help us?
2. How do we give instructions to computers?
3. How do computers know what to do?
4. What happens when we give a computer the wrong steps?
5. Why do we need to follow steps in order?</td><td>Unit Enduring Understandings:
1. Computers are tools that follow instructions to complete tasks.
2. Clear and ordered instructions are essential for computers to function correctly.</td></tr>
<tr><td colspan="3">Vocabulary:</td></tr>
<tr><td>Computer
Hardware
Software</td><td>Code
Debug</td><td>Sequence
Algorithm</td></tr>
<tr><td colspan="3">Students will be able to:
● Identify the basic parts and functions of a computer
● Understand and create simple algorithms
● Practice sequencing through unplugged and digital activities
● Identify and describe the steps in a simple sequence
● Create a basic algorithm to complete a familiar task
● Debug a simple set of directions with guidance
● Follow step-by-step instructions to solve a problem
● Communicate how computers use code to complete tasks</td></tr>
<tr><td>Unit 1 Focus: We can learn how to think like computers! What is a computer and how does it follow instructions through algorithms and sequencing?

Resources used:</td><td colspan="2"><u>Week 1:</u>
Lesson Title: What is a computer?
Key Activities: Mystery Science: What is a computer? Identify hardware/software components
<u>Week 2:</u>
Lesson Title: Tracing Algorithms
Key Activities: Code.org: Finger Tracing Algorithms: Use paper programming to trace simple sequences</td></tr>
</table>

Mystery Science: "What were the first computers like?" "Why were traffic lights invented?" **SAM Labs:** SAM Studio (Intro lighting project) **Code.org:** CS Fundamentals Course A/Graph Paper Programming	**<u>Week 3:</u>** **Lesson Title:** Light Sequence Builder **Key Activities**: SAM Labs: Program a light LED in sequence **<u>Week 4:</u>** **Lesson Title:** Traffic Lights **Key Activities**: Mystery Science: Mini-lesson: Why were traffic lights invented? Design a simple tool like a light switch

Learning Activities:

Amistad Law & DEI (N.J.S.A. 18A:52-16A-88 & 18A:35-4.36a)

- Share STEM Spotlight stories featuring African American innovators such as Garrett Morgan: Inventor of the traffic light. These brief biographies can be introduced during morning meetings or journaling to show innovation comes from diverse backgrounds.

Climate Change Alignment

- Explore how digital tools help monitor energy use.
- Discuss patterns to conserve resources.
- Introduce simple cause-and-effect thinking during sequencing activities—e.g. "If we leave a light on when rooms are empty, what happens?"
- Frame early coding tasks (like turning a light on/off) as small steps toward smart systems that save energy—bridging early tech awareness with resource mindfulness.

Assessment Evidence

Formative Assessments:

- Observation checklists during unplugged activities (e.g., hardware/software identification;sequencing games)
- Student think-alouds while creating or debugging code
- "Turn and talk" prompts: "What step comes next?"
- Quick exit tickets with images (e.g., circle the next step in a sequence)
- Teacher questioning during hands-on tasks
- Student responses during discussions
- Observation of sequencing activities

Summative Assessments:

- Draw and label a computer with components
- Performance task: Create and explain a simple sequence to complete a classroom routine or tech task
- Mini coding project using SAM Labs or Code.org with clear steps and output
- Oral presentation: “Here’s what I told my light/motor to do”
- Illustrated algorithm (drawing with labels or steps)

Common Benchmark Assessments:

- Pre/post comparison of student ability to follow or create sequences
- Common classroom task: Create and debug a 3-step coding sequence
- Rubric for observing use of vocabulary (algorithm, sequence, debug) in student explanations

Alternative Assessments:

- Story map coding (students draw a sequence for a familiar story or routine)
- Movement sequence challenge: “Can you act out the steps?”
- Photo journal documenting a coding or building activity, narrated by the student
  Partner coding: one student gives steps, the other acts them out (“human robot”)

Core Instructional & Supplemental Materials			
Sam Labs	Code.org	Typing Club	Mystery Science

Accommodations and Modifications:
Students with Disabilities, English Language Learners,
Students at Risk of Failure, Students with 504s, Gifted & Talented Students

Specific Strategies and Practices that Support Students with Disabilities:

Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, the instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

- Small group/One to one
- Additional time - Review of directions
- Student restates information
- Space for movement or breaks
- Extra visual and verbal cues and prompts
- Preferential seating
- Follow a routine/schedule

- Rest breaks
- Verbal and visual cues regarding directions and staying on task
- Checklists
- Immediate feedback

Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts
- Personal Glossary
- Extended Time
- Simplified/Verbal Instructions
- Frequent Breaks
- Visual learning- including graphic organizers
- Teacher modeling

Students at Risk of Failure

- Home/School Connection
- Alternative Assessments
- Learning Contracts
- Leveled Rubrics and Tiered Activities
- Work Alone Choice
- Group Work Choice

Students with 504 Plans

- Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
- 504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way.
- Students' accommodations are outlined in their individual 504 plan.

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

- Homogeneous Grouping
- Small Group In-Depth Instruction
- Alternative Assessments, Supplemental Reading, Engaging projects, Differentiated Online Practice
- Pre-Assess to provide Differentiated Instruction to Accelerate Learning

Unit 2

Desired Results

Unit 2 Title: Exploring Patterns and Problem Solving

Unit Summary: In this unit, students will apply logical thinking to explore patterns in nature and code while solving basic engineering challenges.

Learning Standards

8.1.2.AP.1 - Model daily processes by creating and following algorithms to complete tasks.
8.1.2.AP.4 - Break down a task into a sequence of steps.
8.1.2.CS.1 - Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
8.1.2.CS.2 - Explain the functions of common software and hardware components of computing systems.
8.1.2.CS.3 - Describe basic hardware and software problems using accurate terminology.
8.2.2.EC.1 - Identify and compare technology used in different schools, communities, regions, and parts of the world.

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills

9.4.5.CT.2 - Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem.

9.4.2.CT.1 - Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem
9.4.2.CT.2 - Identify possible approaches and resources to execute a plan
9.4.2.IML.2 - Represent data in a visual format to tell a story about the data
9.4.2TL.1 - Identify the basic features of a digital tool and explain the purpose of the tool.
9.4.2.GCA.1 - Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals

Interdisciplinary Connections

NJSLS - SCIENCE 2020

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

NJSLS-ELA 2023

RL.CR.1.1. Ask and answer questions about key details in a literary text (e.g., who, what, where, when, why, how).
RI.CI.1.2 Determine the main topic and retell a series of key details in informational texts (e.g., who, what, where, when, why, how).
RL.IT.1.3. Describe characters, settings, and major event(s) in a story, using key details.
W.IW.K.2. - Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.

NJSLS-MATH 2023

1.OA.C.5 - Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
1.OA.D.8 - Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers.
1.DL.A.1- Represent and interpret data: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Learning Targets

Unit Essential Questions:	**Unit Enduring Understandings:**
1. How can we use patterns to solve problems? 2. How do we break a problem into smaller parts?	1. Patterns help us recognize and solve problems. 2. Problem solving involves understanding steps and organizing actions logically.

Vocabulary:

Pattern	Cause and Effect	Loop	Debug

Students will be able to:

- Use patterns in block-based code to solve puzzles.
- Apply basic problem-solving strategies in hands-on experiments.

● Recognize cause and effect in technology and nature.

Unit 2 Focus: *We can use patterns and logical thinking to solve problems through both unplugged and digital activities.* Resources used: **SAM Labs:** SAM Studio blocks for light/sensor activities: Add Sensor Control-Motion sensor to light **Code.org:** Unplugged Conditionals - If- Then Activities; CS Fundamentals Course B **Mystery Science:** Pushes and Pulls: How are magnets made?	**Week 5:** **Lesson Title:** Conditionals Game **Key Activities**: Play an unplugged conditionals game (Code.org) **Week 6:** **Lesson Title:** Sensor-Trigger Light **Key Activities**: SAM Labs: Use a motion sensor to trigger a light **Week 7:** **Lesson Title:** Push and Pull Engineering **Key Activities**: Mystery Science: Pushes and Pulls - Design a test to demonstrate pushes and pulls **Week 8:** **Lesson Title:** Block Maze Coding **Key Activities**: Code.org: Complete coding puzzles in block maze.

Learning Activities:
Amistad Law & DEI (N.J.S.A. 18A:52-16A-88 & 18A:35-4.36a)
- Share STEM Spotlight stories featuring AAPI individuals who have made a lasting impact on technology. Such as: Reshma Saujani: Founder of Girls Who Code, an organization focused on closing the gender gap in tech jobs.
- Their stories highlight the value of diverse perspectives in innovation and building a more equitable tech industry. These brief biographies can be introduced during morning meetings or journaling to show innovation comes from diverse backgrounds.

Climate Change Alignment
- Design a code simulating season patterns (e.g. sun, wind). Reflect on nature's cycles.
- Reflection prompts: Encourage students to think and journal about how sensor-based systems can help the environment.

Assessment Evidence

Formative Assessments:
- Participation in unplugged games and group activities
- Observational checklists during science stations
- "Turn and talk" partner reflections: What did we observe? What happened next?

● Verbal or pictorial exit slips reflecting problem-solving steps ● Teacher check-ins during pattern challenges
Summative Assessments: ● Complete a coding puzzle with correct sequence ● Explain a problem-solving process using pictures or words ● Science journal review: drawings and observations show understanding of patterns
Common Benchmark Assessments: ● Common class task: Build and explain a model showing a push or pull design idea ● Shared rubric to assess use of science vocabulary and sequencing ● "Before and after" comparison of pushes and pulls drawings
Alternative Assessments: ● Create a weather story using drawings or puppets ● Build a model in a center and explain it to a peer or teacher ● Record a short video explanation of how sunlight changes things ● Use emojis or image cards to sequence events or patterns

Core Instructional & Supplemental Materials			
Sam Labs	Code.org	Typing Club	Mystery Science

Accommodations and Modifications: Students with Disabilities, English Language Learners, Students at Risk of Failure, Students with 504s, Gifted & Talented Students
Specific Strategies and Practices that Support Students with Disabilities: Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, the instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner. ● Small group/One to one ● Additional time - Review of directions ● Student restates information ● Space for movement or breaks ● Extra visual and verbal cues and prompts, Verbal and visual cues regarding directions and staying on task ● Preferential seating

- Follow a routine/schedule, Rest breaks
- Checklists, Immediate feedback

Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts, Teacher modeling
- Personal Glossary
- Extended Time
- Simplified/Verbal Instructions
- Visual learning- including graphic organizers

Students at Risk of Failure

- Home/School Connection
- Alternative Assessments, Learning Contracts, Leveled Rubrics and Tiered Activities
- Work Alone Choice, Group Work Choice

Students with 504 Plans

- Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
- 504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way.
- Students' accommodations are outlined in their individual 504 plan.

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

- Homogeneous Grouping, Small Group In-Depth Instruction
- Alternative Assessments, Differentiated Online Practice
- Pre-Assess to provide Differentiated Instruction to Accelerate Learning
- Supplemental Reading, Engaging projects

Unit 3

Desired Results

Unit 3 Title: Designing with Code and Engineering Concepts

Unit Summary: In this unit, students will integrate coding and physical computing tools to design interactive projects and begin structured engineering practices.

Learning Standards

8.1.2.AP.3 - Create programs with sequences and simple loops to accomplish tasks.
8.1.2.AP.4 - Break down a task into a sequence of steps.
8.1.2.CS.1 - Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
8.2.2.ED.1 - Communicate the function of a product or device.
8.2.2.ED.2 - Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.
8.2.2.ED.3 - Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ITH.3 - Identify how technology impacts or improves life.
8.2.2.ITH.4 - Identify how various tools reduce work and improve daily tasks.
8.2.2.ITH.5 - Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills

9.4.2.CI.1 - Demonstrate openness to new ideas and perspectives
9.4.2.CT.3 - Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.4.2.IML.1 - Identify a simple search term to find information in a search engine or digital resource.
9.4.2.GCA.1 - Analyze how culture shapes individual and community perspectives and points of view

Interdisciplinary Connections

NJSLS - SCIENCE 2020

K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

NJSLS MATH 2023

1.DL.A.1 Represent and interpret data. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. Use appropriate tools strategically. (1-PS4-4) **NJSLS ELA 2023** RI.CI.K.2. - With prompting and support, identify the main topic and key details of an informational text (e.g., who, what, where, when, why, how). SL.PI.K.4. Describe familiar people, places, things, and events and, with prompting and support, provide additional detail. W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas SL.UM.1.5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Learning Targets			
Unit Essential Questions: 1. How can we use technology to create solutions? 2. What is the process for designing something new?		**Unit Enduring Understandings:** 1. Technology can be used to build helpful tools 2. The engineer's design process helps us solve real-world problems.	
Vocabulary:			
sensor loop	code design	input output	prototype
Students will be able to: • Use patterns in block-base code to solve puzzles. • Apply basic problem-solving strategies in hands-on experiments. • Recognize cause and effect in technology and nature. • Explain how their design works using drawings, words, or technology			
Unit 3 Focus: *We can integrate our coding and engineer design process to create interactive solutions. Use sensors and actuators in simple circuits with*	**<u>Week 9:</u>** **Lesson Title:** LED Loop Lights **Key Activities**: Sam Labs: Use a loop to automate light behavior		

SAM Labs; Follow the design process to plan and build a prototype; Combine input and output devices to solve a problem. **Resources used:** **SAM Labs:** SAM Studio - Light that reacts to dark design **Code.org:** Simple Animation - Drag and Drop Sprites **Mystery Science** - Structures: Build and Test Bridges	**<u>Week 10:</u>** **Lesson Title:** Animal Reaction Designer **Key Activities**: Mystery Science: Create animal adaptation models **<u>Week 11:</u>** **Lesson Title:** Simple Animation Creator **Key Activities**: Code.org: Make a simple animation using blocks **<u>Week 12:</u>** **Lesson Title:** Night Light Challenge **Key Activities**: SAM Labs Sensor Night Light: Design a night light that reacts to dark; Students design their own helpful tool (draw, plan, explain); Begin building prototypes with teacher support **<u>Week 13:</u>** **Lesson Title:** Bridge and Tower Builder **Key Activities**: Students build and test simple bridges/towers

Learning Activities:

Diversity & Inclusion Alignment (N.J.S.A. 18A:35-4.36a)

- Inclusive Materials: Use picture cards, storybooks, and discussion prompts that represent a variety of cultures, abilities, and backgrounds to show that anyone can become a STEM problem-solver.
- Collaborative Work Norms: Encourage all students' ideas and voices during design tasks, reinforcing respect and equity in project teams.

Climate Change Alignment

- Connection during Week 12 (Night Light Challenge), discuss how sensors are used to measure classroom light/shadow and the use of solar energy and conservation

Assessment Evidence

Formative Assessments:

- Observation checklists during building and coding activities
- "Think-Pair-Share" responses
- Teacher check-ins during pattern challenges
- Participation in unplugged games and group activities
- Use of rubrics during guided activities
- Feedback on prototyping
- Journal entries on the design process

- Exit slips with sentence starters like “Today I learned . . .” or reflection on problem-solving steps.

Summative Assessments:
- Completed smart design project with verbal or visual explanation
- Create a working project using sensors or code
- Present the steps used to build a prototype
- Oral presentation of their working model or sensor-based system
- Comparison of early and final drawings to show growth in understanding

Common Benchmark Assessments:
- Rubric-based scoring of student models (e.g., Does the design meet a need?)
- Shared performance task: “Build a helper for a living thing” with checklist criteria
- Assessment of vocabulary understanding via picture labeling or oral quiz

Alternative Assessments:
- Record short videos or audio of students explaining how their project works
- Student journals (drawing + sentence dictation) about how they helped a living thing
- Use puppets or dramatic play to explain a plant/animal problem and solution
- Partner drawings showing “before” and “after” scenes with their tool in action

Core Instructional & Supplemental Materials			
Sam Labs	Code.org	Typing Club	Mystery Science

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- Homogeneous Grouping
- Small Group In-Depth Instruction
- Differentiated Online Practice
- Alternative Assessments
- Pre-Assess to provide Differentiated Instruction to Accelerate Learning
- Supplemental Reading
- Engaging projects

Unit 4

Desired Results

Unit 4 Title: Building, Testing, and Sharing Creations

Unit Summary: In this unit, students will use their understanding of computing and engineering to plan, build, and present final projects that demonstrate their learning.

Learning Standards

8.1.2.AP.4 - Break down a task into a sequence of steps.
8.1.2.IC.1 - Compare how individuals live and work before and after the implementation of new computing technology.
8.1.2.CS.1 - Select and operate appropriate software to complete tasks.
8.2.2.ED.1 - Communicate the function of a product or device.
8.2.2.ED.3 - Use a design process to solve a simple problem.

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills

9.4.2.CT.1 - Demonstrate openness to new ideas and ways of doing things.
9.4.2.CT.2 - Identify possible approaches and resources to execute a plan.
9.4.2.GCA.1 - Demonstrate respectful behavior when working with others in teams.
9.4.2TL.2 - Create a document using a word processing application.

Interdisciplinary Connections

NJSLS - SCIENCE 2020

K-2-ETS1-1 - Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 - Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 - Analyze data from tests of two objects to compare the strengths and weaknesses of how each performs.

NJSLS - ELA - 2023

SL.UM.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.

W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.

SL.AS.K.6. Speak audibly and express thoughts, feelings, and ideas clearly
SL.PE.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

NJSLS - MATH 2023
K.CC.B.5 – Count to answer “how many?” questions about as many as 20 things arranged in a line, rectangular array, or circle.
K.G.B.5 – Model shapes in the world by building shapes from components (e.g., sticks and clay balls).
K.DL.A.1 - Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
1.G.A.2 - Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.4

Learning Targets

Unit Essential Questions:	**Unit Enduring Understandings:**
1. How do we plan, test, and improve our creations 2. How can we use what we know to solve a real-world problem? 3. What steps do we take to build something that works? 4. Why is it important to share our work with others? 5. What makes a good teammate when working on a project? 6. How can we share what we’ve made with others?	1. We can combine what we've learned about science, technology, and design to create useful solutions. 2. Inventors follow a process. They plan, build, test, and improve to make their ideas real. 3. Testing and improving are essential parts of the design process. 4. When we explain our thinking, others can learn from us and help make our ideas even better as we learn and grow. 5. Good teamwork means listening, sharing, and respecting everyone’s ideas.

Vocabulary:

invent project teamwork plan presentation	model test revise improve present	share showcase problem solution feedback

Students will be able to:

- Design and build a model that solves a simple, real-world problem
- Explain their invention using drawings, words, or digital tools
- Work respectfully with teammates to plan and complete a project

• Test and revise a prototype of their design and make improvements based on feedback and results • Present their final project (a digital or physical computing project) to others, describing how it works and helps others	
Unit 4 Focus: *We can bring our designs full circle by planning, building, testing and presenting technology projects.* **Resources used:** **SAM Labs:** Sam's Studio: Light Sensors **Code.org:** Unit: "Hello World - Animals"	**<u>Week 14:</u>** **Lesson Title:** Story Animation Project **Key Activities**: Review what we've learned about building, coding, and helping others; Create an animated story using animal sprites. **<u>Week 15:</u>** **Lesson Title:** Input Combo Circuit **Key Activities**: Using SAM Labs: Combine Inputs with button and light sensor; Use two sensors to trigger an action. **<u>Week 16:</u>** **Lesson Title:** Design Plan Sketch **Key Activities**: Design and Prototype - Sketch and plan a final technology project **<u>Week 17:</u>** **Lesson Title:** Project Build Session **Key Activities**: Build final project from a selected platform **<u>Week 18:</u>** **Lesson Title:** Project Showcase **Key Activities**: Present your final invention to the class; Showcase and reflection
Learning Activities: ***Diversity & Inclusion Alignment (N.J.S.A. 18A:35-4.36a)*** • Inclusive Materials: Use picture cards, storybooks, and discussion prompts that represent a variety of cultures, abilities, and backgrounds to show that anyone can become a STEM problem-solver. • Collaborative Work Norms: Encourage all students' ideas and voices during design tasks, reinforcing respect and equity in project teams. ***Climate Change Alignment*** • **Connection:** Encourage students to consider how their project could help reduce resource use or respond to environmental challenges—such as energy-efficient tools or systems that sense and act to conserve water or electricity. • **Alignment:** This connects to New Jersey's integrated climate change mandate, which requires teaching climate solutions across subjects—including technology and engineering systems that support sustainability, energy-saving habits or awareness.	

Assessment Evidence
Formative Assessments: ● Observation checklists during group collaboration and building ● Think-alouds during planning and testing ● Reflections during revision process ● Peer feedback using sentence starters (e.g., "I like how you…") ● Teacher conferences with student teams during each phase ● Drawings or models to show understanding of their invention's purpose
Summative Assessments: ● Final STEM project evaluated with a simple rubric (e.g., Meets a need, Has a working feature, Student can explain it) ● Oral or visual presentation of the project to peers or families ● Student reflection: What they made, what problem it solves, and how it works ● Before-and-after comparison of early design sketch to final model
Common Benchmark Assessments: ● Common STEM Showcase rubric applied across classrooms ● Checklist of design process steps (Plan, Build, Test, Improve, Share) ● Vocabulary check or concept sorting (e.g., Problem vs. Solution)
Alternative Assessments: ● Student "Innovation Booklets" or journals showing each project phase ● Gallery walk with teacher/peer feedback stations ● Build-a-Buddy: Student explains their invention to a puppet or visitor

Core Instructional & Supplemental Materials			
Sam Labs	Code.org	Typing Club	Mystery Science

Accommodations and Modifications: Students with Disabilities, English Language Learners, Students at Risk of Failure, Students with 504s, Gifted & Talented Students
Specific Strategies and Practices that Support Students with Disabilities: Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the

general education curriculum, the instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

- Small group/One to one
- Additional time - Review of directions
- Student restates information
- Space for movement or breaks
- Extra visual and verbal cues and prompts, Verbal and visual cues regarding directions and staying on task
- Preferential seating
- Follow a routine/schedule, Rest breaks
- Checklists, Immediate feedback

Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts, Teacher modeling
- Personal Glossary
- Extended Time
- Simplified/Verbal Instructions
- Visual learning- including graphic organizers

Students at Risk of Failure

- Home/School Connection
- Alternative Assessments
- Learning Contracts
- Leveled Rubrics and Tiered Activities
- Work Alone Choice, Group Work Choice

Students with 504 Plans

- Teachers are responsible for implementing designated services and strategies identified on a student’s 504 Plan.
- 504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way.
- Students' accommodations are outlined in their individual 504 plan.

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

- Homogeneous Grouping
- Small Group In-Depth Instruction
- Differentiated Online Practice
- Alternative Assessments

- Pre-Assess to provide Differentiated Instruction to Accelerate Learning
- Supplemental Reading
- Engaging projects