Wall Township Public Schools	Board Approval Date: 8/19/2025

Course Title: Grade Kindergarten - STEM

Course Description: In this course, kindergarten students build foundational STEM skills through hands-on exploration, playful coding, and real-world science investigations. Using tools from Code.org, SAM Labs, and Mystery Science, students learn how technology helps us understand patterns in nature, solve simple problems, and communicate ideas. Through designing, testing, and sharing their own inventions, students begin to think like engineers, programmers, and scientists—while building creativity, collaboration, and curiosity.

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: Thinking Like a Computer	1-4
Unit 2: Exploring the Natural World	5-9
Unit 3: Living Systems and Smart Design	10-13
Unit 4: Inventing, Sharing, and Working Together	14-18

Unit 1

Desired Results

Unit 1 Title: Introduction to STEM and Computational Thinking

Unit Summary: In this unit students learn how computers follow instructions and explore the basics of sequencing and logic through play and early coding.

Learning Standards

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.
8.1.2.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.
8.2.2.ED.1 - Explain the functions of a system and its subsystems.
8.2.2.ED.3 - Communicate the function of a product or device.

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.

9.4.2.TL.2: Create a document using a word processing application.

Interdisciplinary Connections

NJSLS - ELA 2023

RI.CR.K.1 - With prompting and support, ask and answer questions about key details in 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.

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

NJSLS - Math 2023

K.M.A.1 - Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.CC.A.3 - Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).

NJSLS - SCIENCE 2020

K-PS2-1 - Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K-PS2-2 - Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Learning Targets	
Unit Essential Questions: 1. How do computers know what to do? 2. What happens when we give a computer the wrong steps? 3. Why do we need to follow steps in order? 4. How can we use technology to solve simple problems?	**Unit Enduring Understandings:** 1. Computers follow instructions, called algorithms, created by people to complete tasks. 2. Debugging helps us find and fix mistakes in the steps so the program works correctly. 3. Sequencing is important because steps must be in the right order for tasks to be completed correctly. 4. Technology can help us solve problems when we use logic, creativity, and clear instructions.

Vocabulary:

Algorithm Sequence Step Computer	Code Debug Loop Instruction	Direction Input Output Problem

Students will be able to:

- 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
- Use coding tools to model input and output
- Follow step-by-step instructions to solve a problem
- Communicate how computers use code to complete tasks

Unit 1 Focus: *In this unit, we learn how to think like computers! We practice giving clear directions, fixing mistakes, and using simple code to make lights turn on and things move. We'll play games, build things, and*	**<u>Week 1:</u>** **Lesson Title:** What Is STEM? What Is a Sequence? **Key Activities**: Introduction to STEM through hands-on materials and team challenges; Unplugged activity: "My Morning Routine" sequencing cards **<u>Week 2:</u>** **Lesson Title:** Code a Story: Beginning, Middle, End **Key Activities**:Code.org Course A/B Lesson 1 – Drag-and-drop sequencing; Create a story map with three-part coding actions; Interactive whiteboard modeling of steps and outcomes

explore how technology helps us solve problems. **Resources used:** **SAM Labs:** SAM Studio (Intro lighting project) **Code.org:** Course B – Lesson 1	**Week 3:** **Lesson Title:** Lights On with Coding **Key Activities**: SAM Labs: Build a basic circuit using SAM blocks to turn a light on and off; Identify inputs and outputs in real-world systems **Week 4:** **Lesson Title:** Push and Pull Coding **Key Activities**: SAM Labs: Program a simple motor system that responds to movement or force; Hands-on demo: Coding a toy car to move; Sorting activity: Push vs. Pull (digital and physical)

Learning Activities:
Climate Change Alignment

Focus: Awareness of how technology interacts with the environment

- Introduce simple cause-and-effect thinking during sequencing activities—e.g. "If we leave a light on when rooms are empty, what happens?"
- Use a "Sunlight and Shade" engineering challenge (e.g. shade over ice cube) to open a dialogue about how we use energy and how design can help protect Earth subjecttoclimate.nyc3.cdn.digitaloceanspaces.com+3mtsd.k12.nj.us+3platform.njschoolclimate.org+3.
- 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., 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

Summative Assessments:

- Performance task: Create a 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 the Natural World

Unit Summary: In this unit, students observe and explore patterns in the world around them, including light, weather, and movement. They use simple tools and technology to collect data, test ideas, and build an understanding of how nature works. Through hands-on investigations, students begin to see how science helps us make sense of everyday life.

Learning Standards

8.1.2.AP.4 - Break down a task into a sequence of steps.
8.2.2.ED.1 - Communicate the function of a product or device.
8.2.2.ED.3 - Communicate the function of a product or device
8.2.2.ED.4 - Identify constraints and their role in the engineering design process
8.2.2.NT.1 - Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.

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-ESS2-1 - Use and share observations of local weather conditions to describe patterns over time.

K-ESS3-2 - Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

K-PS3-1 - Make observations to determine the effect of sunlight on Earth's surface.

K-PS3-2 - Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

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.

NJSLS-ELA 2023

RI.CR.K.1 - With prompting and support, ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how).

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

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

NJSLS-MATH 2023

K.M.A.1 - Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

<table>
<tr><th colspan="4">Learning Targets</th></tr>
<tr><td colspan="2">Unit Essential Questions:
How can we observe and describe changes in the world around us?
Why is it important to notice patterns in nature?
How can we use simple tools and materials to solve everyday problems?</td><td colspan="2">Unit Enduring Understandings:
We can use our senses, tools, and technology to observe patterns in nature like weather, light, and temperature.
Recognizing patterns helps us predict what might happen and make smart choices about how we live and stay safe.
Technology and design can help us create solutions that make life easier, safer, and more comfortable.</td></tr>
<tr><td colspan="4">Vocabulary:</td></tr>
<tr><td>Weather
Sunlight
Shade</td><td>Pattern
Temperature
Observe</td><td>Predict
Tool
Design</td><td>Build
Problem
Solution</td></tr>
<tr><td colspan="4">Students will be able to:
Observe and describe daily weather conditions using simple tools
Identify patterns in nature such as changes in sunlight and temperature
Use materials to design and build a structure that solves a problem
Communicate observations through drawings, words, or models
Collaborate with peers to plan and test simple solutions</td></tr>
<tr><td colspan="2">Unit 2 Focus: We can explore the world around us using our eyes, our brains, and simple tools. By watching the weather, sunlight, and how things move, we can learn how nature works and use</td><td colspan="2"><u>Week 5:</u>
Lesson Title: Watching the Weather
Key Activities: Mystery Science: Explore weather patterns; Make a daily weather chart; Begin weather journal
<u>Week 6:</u>
Lesson Title: What Makes Things Move?</td></tr>
</table>

technology to help us solve little problems. Resources used: **SAM Labs** (SAM Studio blocks for light/sensor activities) **Code.org (**Course A Lesson 4,9) **Mystery Science** (Weather and Sunlight mini-lessons)	**Key Activities**: SAM Labs: Explore motion-triggered systems, Design and test a simple ramp or push toy, Sort "push" and "pull" pictures **Week 7:** **Lesson Title:** Sunny or Shady? **Key Activities**: Mystery Science: Explore how the sun warms Earth, Create a shade structure with classroom materials, Observe ice cube melting experiment **Week 8:** **Lesson Title:** Coding Nature's Patterns **Key Activities**:Code.org: Use loops and events to model sun/rain patterns; Draw a sequence of steps to "water a plant" using code blocks; Play an unplugged "weather robot" game **Week 9:** **Lesson Title:** Building a Weather Helper **Key Activities**:SAM Labs: Program a "sunlight sensor" or "rain alert"; Draw and label parts of the project; Share weather helper ideas with the class

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—even at the kindergarten level—such as George Washington Carver, who helped solve agricultural problems through scientific observation and creativity. These brief biographies can be introduced during morning meetings or journaling to show innovation comes from diverse backgrounds.

Climate Change Alignment

- During lessons like **"Sunny or Shady?"** (Week 7) and **"Building a Weather Helper"** (Week 9), discuss how designing systems—like shade structures or sunlight sensors—can help conserve energy and protect the environment.
- Frame those STEM tasks as early climate action by teaching that technology and thoughtful design can help reduce waste and care for the Earth.
- Reflection prompts: Encourage students to think and journal about how sensor-based systems can help the environment.

Assessment Evidence

Formative Assessments:

- Daily weather journals with drawings and temperature symbols
- Observational checklists during science stations (e.g., push/pull, light/shade)
- "Turn and talk" partner reflections: What did we observe? What happened next?
- Verbal or pictorial exit slips (e.g., "Draw something you saw in the sunlight today")

Summative Assessments:

- Design and present a “weather helper” or sun-blocking solution
- Complete a sequence chart showing a pattern in nature (e.g., sunny → hot → shade)
- Oral presentation with a partner: “What we made and how it helps”
- Science journal review: drawings and observations show understanding of patterns

Common Benchmark Assessments:

- Common class task: Build and explain a model showing a weather pattern or design idea
- Shared rubric to assess use of science vocabulary and sequencing
- “Before and after” comparison of weather vocabulary and ability to describe conditions

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

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- Small group/One to one
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- 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

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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.
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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: Living Systems and Smart Design

Unit Summary: In this unit, students explore how living things interact with their environments and how we can design smart solutions to support them. Using sensors, light, and movement, students create simple systems that respond to real-world needs. They apply early coding concepts like loops and conditionals to build helpful tools that connect nature and technology.

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.
8.2.2.NT.1 - Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.
8.2.2.ED.1 - Communicate the function of a product or device.
8.2.2.ED.3 - Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ITH.2 - Explain the purpose of a product and its value.

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.
9.4.2TL.2 - Create a document using a word processing application.
9.4.2.GCA.1 - Analyze how culture shapes individual and community perspectives and points of view

Interdisciplinary Connections

NJSLS - SCIENCE 2020

K-2-ETS1-2 - 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-ESS3-1 - Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

K-ESS3-3 - Communicate solutions that will reduce the impact of climate change and humans on the land, water, air, and/or other living things in the local environment.

K-LS1-1- Make observations of plants and animals to compare the diversity of life in different habitats.

NJSLS MATH 2023

K.M.A.1 - Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.OA.A.1 - Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

K.CC.B.4.A - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

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

Learning Targets

Unit Essential Questions:	**Unit Enduring Understandings:**
1. How do living things survive and stay safe in their environments? 2. How can we use technology to help living things? 3. What happens when we change the steps in a code or program?	1. Plants and animals have basic needs, and where they live helps them meet those needs. 2. We can design tools and systems that solve real problems and support people, animals, and nature. 3. Changing the order or instructions in a program changes what the system does—just like following steps in a plan.

Vocabulary:

habitat sensor loop	code plant animal	light movement design	build solution pattern

Students will be able to:

- Identify the basic needs of plants and animals in their environments
- Describe how sensors and simple technology can help living things
- Use loops and sequences to create simple programs that solve problems
- Design and build a basic model or structure to support a living system
- Explain how their design works using drawings, words, or technology

Unit 3 Focus: *We can help living things by learning what they*	**<u>Week 9:</u>** **Lesson Title:** What Do Living Things Need?

need and building smart tools to solve real problems. When we use code and our creativity, we can make things that move, light up, and help nature. **Resources used:** **SAM Labs:** SAM studio - Sensor-based Night Light, Smart Doorbell **Code.org:** Course A (5-6) **Mystery Science** - Bug Habitats	**Key Activities**: Mystery Science bug habitat exploration; Create mini plant/animal needs poster; Class brainstorm: How can we help nature? **Week 10:** **Lesson Title:** Meet the Problem Solvers (Sensors & Systems) **Key Activities**: SAM Labs Smart Doorbell demo; Students explore how sensors work; Match real-life tools with the problems they solve **Week 11:** **Lesson Title:** Loops and Movement **Key Activities**:Code.org Lesson 6 (Loops); Act out loops in daily routines; Build a simple system that uses repetition (e.g., blinking light) **Week 12:** **Lesson Title:** Let's Design It! **Key Activities**: SAM Labs Sensor Night Light; Students design their own helpful tool (draw, plan, explain); Begin building prototypes with teacher support **Week 13:** **Lesson Title:** Show What You Made **Key Activities**: Finalize and test designs; Peer-to-peer "gallery walk"; Students present their projects and explain how it helps a living thing

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 to Living Systems: During Week 9 (What Do Living Things Need?), discuss how changing weather patterns or habitat loss affect living things, and brainstorm ways smart designs can help (e.g. shade structures or sensor-based feeders).
- Design Focus: When building sensor-based tools (like the light-sensitive system in Week 10 or Week 12), frame them as small steps toward energy conservation or habitat support.
- Place-Based Learning: Relate projects to local flora, fauna, or climate concerns (e.g., NJ bees or garden visitors), helping students think about how technology can play a role in environmental stewardship.

Assessment Evidence

Formative Assessments:

- Observation checklists during building and coding activities
- "Think-Pair-Share" responses about plant/animal needs
- Drawing models of living systems and their designs
- Exit slips with sentence starters like "Today I learned that plants need..."

Summative Assessments:

- Completed smart design project with verbal or visual explanation
- Students identify and explain the living thing their design supports
- 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

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

Unit 4

Desired Results

Unit 4 Title: Inventing, Sharing, and Working Together

Unit Summary: In this unit, students apply what they've learned to imagine and create a final STEM project that helps solve a real-world problem. They work together to design, build, and explain their inventions using simple coding, models, and storytelling. Through presenting their work, students practice communication, reflection, and teamwork.

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

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.

Learning Targets

Unit Essential Questions:

1. How can we use what we know to solve a real-world problem?
2. What steps do we take to build something that works?
3. Why is it important to share our work with others?
4. What makes a good teammate when working on a project?

Unit Enduring Understandings:

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. When we explain our thinking, others can learn from us and help make our ideas even better.
4. Good teamwork means listening, sharing, and respecting everyone's ideas.

Vocabulary:

invent project teamwork plan	model test improve present	share idea problem solution

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 their design and make improvements based on results
- Present their final project to others, describing how it works and helps others

Unit 4 Focus: *We can use everything we've learned to create our own helpful inventions.*	**<u>Week 14:</u>** **Lesson Title:** Let's Be Inventors! **Key Activities**: Review what we've learned about building, coding, and helping others; Brainstorm and draw ideas for something helpful we could invent; Choose a problem to solve with your team

We will work as a team, make a plan, build it, test it, and share it with others! **Resources used:** **SAM Labs:** Sam's Studio **Code.org:** Course A (9,12,13)	**Week 15:** **Lesson Title:** Plan and Start Building **Key Activities**: Create a design plan with your team; Use SAM Labs or simple materials to begin building; Practice simple coding steps if needed (lights, sounds, movement) **Week 16:** **Lesson Title:** Test and Improve It **Key Activities**: Test your invention; Talk with your team about what worked and what didn't; Make changes to improve your invention **Week 17:** **Lesson Title:** Get Ready to Share **Key Activities**: Create posters, drawings, or slides to explain your project; Practice telling others how your invention works and why it's helpful; Give and get feedback from classmates **Week 18:** **Lesson Title:** STEM Showcase Week! **Key Activities**: Present your final invention to the class, another class, or families; Celebrate everyone's hard work

Learning Activities:

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

Assessment Evidence

Formative Assessments:

- Observation checklists during group collaboration and building
- Think-alouds during planning and testing
- 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