Readington Township Public Schools

K-3 Computer Science

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Readington Township Public Schools
www.readington.k12.nj.us

Computer Science and Design Thinking
K-2

Strategies

Teacher presentation
Teacher read-aloud
Group discussion
Small Group instruction
Group presentations

Accommodations

Accommodations and Modification Addendum

Assessments

Formative	Summative
• Classroom Discussion • Anecdotal Notes from teacher observation • Cooperative Learning Groups • Exit Slips • Open Ended Questions • Checklists • Teacher Observation • Running Records	• Unit Tests • Quizzes • Assignments in Google Classroom • Projects
Benchmark	**Alternative**
• Notebook check with rubric • End of unit presentation with rubric	• Presentations • Performance Assessments • Role Play

Resources

Required	Supplemental
• Chromebooks • Google Suite • Kodable • Code.org • Common Sense Media	• Weekly Reader • Scholastic News • Brain Pop • You Tube Videos

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. (NJDOE)

Core Ideas	Performance Expectations
Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the	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.

instructions they are given literally.	
A computing system is composed of software and hardware.	8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems.
Describing a problem is the first step toward finding a solution when computing systems do not work as expected.	8.1.2.CS.3: Describe basic hardware and software problems using accurate terminology.

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. (NJDOE)

Core Ideas	Performance Expectations
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.
Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access.	• 8.1.2.NI.3: Create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others. • 8.1.2.NI.4: Explain why access to devices need to be secured

Impacts of Computing

Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and, in turn, computing influences new cultural practices. (NJDOE)

Core Ideas	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.

Data and 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. (NJDOE)

Core Ideas	Performance Expectations
Individuals collect, use, and display data about individuals and the world around them.	8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.
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.

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 communicate with the world in new ways and solve compelling problems. (NJDOE)

Core Ideas	Performance Expectations
Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process.	8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks.
Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images).	8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information.
Computers follow precise sequences of steps that automate tasks.	8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks.
Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.	8.1.2.AP.4: Break down a task into a sequence of steps.
People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary).	• 8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. • 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops.

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. (NJDOE)

Core Ideas	Performance Expectations
Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.	• 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.
Limitations (constraints) must be considered when engineering designs.	8.2.2.ED.4: Identify constraints and their role in the engineering design process.

Interaction 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. (NJDOE)

Core Ideas	Performance Expectations

Human needs and desires determine which new tools are developed.	• 8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. • 8.2.2.ITH.2: Explain the purpose of a product and its value.
Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.	• 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.

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. (NJDOE)

Core Ideas	Performance Expectations
Innovation and the improvement of existing technology involves creative thinking.	• 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.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

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. (NJDOE)

Core Ideas	Performance Expectations
The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	• 8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology. • 8.2.2.ETW.2: Identify the natural resources needed to create a product. • 8.2.2.ETW.3: Describe or model the system used for recycling technology. • 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.

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. (NJDOE)

Core Ideas	Performance Expectations

The availability of technology for essential tasks varies in different parts of the world.	8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

K-2-ETS1: Engineering Design

Performance Expectations	Disciplinary Core Ideas	Science and Engineering Practices
• 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.	● ETS1.A: Defining and Delimiting Engineering Problems ● ETS1.B: Developing Possible Solutions ● ETS1.C: Optimizing the Design Solution	● Asking Questions and Defining Problems ● Developing and Using Models ● Analyzing and Interpreting Data

3-5-ETS1: Engineering Design

Performance Expectations	Disciplinary Core Ideas	Science and Engineering Practices
• **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.	• **ETS1.A: Defining and Delimiting Engineering Problems** Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) • **ETS1.B: Developing Possible Solutions** Research on a problem, such as climate change, should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)	• **Asking Questions and Defining Problems** Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) • **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for

		evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3) • **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

Lesson Activities/Scope and Sequence

Kindergarten

Unit 1: STEM Teamwork & Exploration

Classes: 6 | **Type:** STEM
Students will learn what it means to be a scientist, build STEM identity, and practice teamwork through hands-on exploration and collaborative challenges.
Standards: K-2-ETS1-1, K-2-ETS1-2
Students practice partner norms and learn how scientists and engineers ask questions, explore materials, and work together.
Activities:

- Build your name with STEM materials
- Partner Cup Challenge
- Explore materials and discuss “What is Science?”

Unit 2: Engineering Design Through Literature

Classes: 6 | **Type:** STEM
Students will engage with the Engineering Design Process by responding to literature and applying creativity, measurement, and spatial awareness to solve design challenges.
Standards: K-2-ETS1-1, K-2-ETS1-2
Students create structures based on story prompts, practice symmetry, and sketch designs while building cross-curricular connections.
Activities:

- Respond to *Not a Stick* with a design challenge
- Count and measure while building (*Count on Me*)
- Build symmetrical structures from *Dreaming Up*
- Sketch designs and share with peers

Unit 3: Introduction to Computer Skills & Coding

Classes: 6 | **Type:** Computer Science
Students will build basic computer and coding skills, including typing, mouse control, sequencing, and using

algorithms through digital and unplugged activities. **Standards:** 8.1.2.AP.1–4, 8.1.2.NI.1, 8.1.2.DA.3
Students will gain foundational computer science skills. Through Bee Bots, Kodable, and Typing Jungle, they will develop confidence in keyboarding, coding, and digital interaction.
Activities:

- Typing Jungle with sight word practice
- Bee Bots for sequencing with sight words
- Kodable: loops and algorithm introduction
- Typing Club for numbers and fluency

Unit 4: STEM in Our School & World

Classes: 5| **Type:** STEM/Technology
Students will explore how coding, mapping, and motion apply to their school environment and real-world concepts.
Standards: K-PS2-1, K-PS2-2, 8.1.2.AP.1–2, K-2-ETS1-1
This unit introduces real-world STEM concepts by exploring motion, force, and spatial awareness. Students navigate maps with robots, explore push/pull using magnets, and engage in storytelling and reflection.
Activities:

- Navigate school layout using Bee Bots/Ozobots
- Push & Pull with magnets and data tracking
- Read *Newton and Me* with a reflection journal

Unit 5: Winter Tech & Digital Citizenship

Classes: 6 | **Type:** Technology
Students will continue developing computer skills while learning about responsible digital behavior and applying creativity to seasonal digital projects.
Standards: 8.1.2.AP.1, 8.1.2.NI.1–2, 8.1.2.IC.1
This unit builds on computer skills and introduces digital citizenship through storytelling, discussion, and creative seasonal projects. Students learn how to interact safely and respectfully online while practicing fine motor and technology skills.
Activities:

- Typing sight words and names
- Click-and-drag snowman building and writing
- Read *Chicken Clicking* and discuss online safety
- Bee Bots: code your name

Unit 6: Me, Animals, and the Earth

Classes: 6 | **Type:** STEM/Technology
Students will explore their identity, animal structures, and environmental care through digital storytelling, hands-on models, and coding activities.
Standards: K-LS1-1, K-ESS3-1, K-2-ETS1-1, 8.1.2.AP.4, 8.1.2.DA.3
Students will learn about themselves, animals, and Earth. They create self-portraits, explore life cycles, and engage with Earth Day-themed technology projects that foster awareness and creativity.
Activities:

- Create “All About Me” avatars and writing
- Build animal models and explore life cycles
- Make an Earth Day poster in Google Slides
- Drag-and-drop digital activity (*Cat in the Hat*)
- Code patterns with OzobotsReview typing skills with Typing Jungle

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First Grade

Unit 1: Chromebook Basics & Intro to Devices

Classes: 4 | **Type:** Technology
Students log into devices, navigate Clever and Google Classroom, and identify hardware/software.
Standards: 8.1.2.CS.1, 8.1.2.CS.2, 8.1.2.CS.3
Activities:

- Logging into Clever/Classroom
- Typing sentences in Google Docs
- Copy/paste practice
- Intro to Google Slides

Unit 2: STEM Design with Fairy Tales

Classes: 5 | **Type:** STEM
Students solve character problems from fairy tales through building and design.
Standards: 8.2.2.ED.1, 8.2.2.ED.2, 8.2.2.ED.3, K-2-ETS1-1, K-2-ETS1-2
Introduce the engineering design process through problem-solving with fairy tales. Students build prototypes to help characters overcome challenges.
Activities:

- Build a house that withstands the "Big Bad Wolf" (wind test)
- Construct a bridge for the Three Billy Goats
- Design a way for Rapunzel to escape without using her hair

Unit 3: Exploring Sound & Light

Classes: 2 | **Type:** STEM
Students explore sound vibrations and light/shadow interactions through models and experimentation.
Standards: 8.1.2.AP.1, 8.2.2.ED.1, K-2-ETS1-3
Through hands-on exploration, students investigate how sound travels and how light behaves. They work collaboratively on mini-experiments and models.
Activities:

- Explore sound with cup phones
- Test light passing through different materials
- Design a shadow puppet theater

Unit 4: Introduction to Coding with Kodable

Classes: 3 | **Type:** Technology
Block-based coding introduces loops, sequencing, and debugging.
Standards: 8.1.2.AP.1, 8.1.2.AP.3, 8.1.2.AP.4, 8.1.2.AP.5, 8.1.2.AP.6
Students are introduced to basic block-based programming using Kodable and Code.org. They practice sequencing, loops, and debugging through play-based challenges.

Unit 5: Air & Weather Engineering

Classes: 3 | **Type:** STEM
Students design kites, parachutes, and wind-powered devices.
Standards: 8.2.2.ED.3, K-2-ETS1-2
Using basic engineering concepts, students explore how air affects movement. They design and test parachutes and simple wind-powered kites.
Activities:

- Build and test coffee-filter parachutes
- Create pinwheels and explore wind movement
- Design a kite using straws, string, and paper

Unit 6: Internet Safety & Digital Citizenship

Classes: 2 | **Type:** Technology
Digital safety, passwords, and respectful online behavior.
Standards: 8.1.2.NI.3, 8.1.2.NI.4, 8.2.2.EC.1
Students learn about online safety, keeping passwords private, and how to be kind online.
Activities:

- Common Sense Media digital citizenship videos
- Create a "safe surfing" poster
- Group discussion and role-play scenarios

Unit 7: Google Maps & Me on the Map

Classes: 3 | **Type:** Technology
Students explore school, home, and landmarks using Google Maps.
Standards: 8.1.2.NI.1, 8.1.2.IC.1
Students explore their neighborhood and key landmarks using Google Maps. They discuss how technology helps people connect and navigate.
Activities:

- Find school and home on Google Maps
- Virtual tour of famous landmarks
- Create a map of a dream neighborhood

Unit 8: Engineering Design & Building Challenges

Classes: 5 | **Type:** Engineering
Students explore the engineering design process through building tasks. Emphasis on planning, testing, and redesigning.
Standards: 8.2.2.ED.2, 8.2.2.ED.4, K-2-ETS1-1
Activities:

- Build a tower that can hold a book
- Design a bridge to hold pennies
- Create a raft that floats
- Build a playground with limited materials

Unit 9: Holiday STEM Around the Year

Classes: 4 | **Type:** STEM
Seasonal STEM projects based on holidays and celebrations.
Standards: 8.2.2.ED.2, 8.2.2.ITH.3, K-2-ETS1-1, K-2-ETS1-2
Students will design challenges that relate to seasons and holidays. Encourage teamwork, creativity, and problem-solving.
Activities:

- Design a leprechaun trap
- Build a sled for a snowman in winter
- Construct a turkey hideout

Unit 10: Nonfiction Writing & 3D Printed Object Presentation

Classes: 4 | **Type:** STEM + Technology

Students write simple nonfiction texts, design a related 3D object, and present their work to the class.
Standards: 8.1.2.DA.1, 8.2.2.ED.1, 8.2.2.ED.3
Students write about a nonfiction topic in Google Slides and create a connected 3D object using Toybox 3D Printers
Activities:

- Research a favorite animal or place
- Create an informational Slideshow
- Design a 3D model (example: build a habitat or model of their topic)

Second Grade

Unit 1: My Digital World

Classes: 6 | **Type:** Technology
Students will identify parts of computing systems, practice safe and respectful technology use, and understand how data is collected, stored, and shared.
Standards: 8.1.2.CS.1–3, 8.1.2.NI.1–4, 8.1.2.DA.2
Students explore computing systems, safe technology use, internet awareness, and basic data storage. They identify hardware and software, discuss responsible online behavior, and use digital tools to share personal information safely and appropriately.
Activities:

- Scavenger hunt: Hardware vs. software
- Digital citizenship (creating strong passwords)
- Network modeling with yarn“All About Me” Google Slides presentation
- Class discussion: How we use tech every day

Unit 2: Needs vs. Wants & Our Digital Community

Classes: 5 | **Type**: STEM
Students will differentiate between needs and wants, design a model community, and apply basic programming concepts to navigate through the community using robotic devices.
Standards: 8.1.2.AP.1–6, 8.2.2.ITH.1–5, 8.2.2.ED.2–4
Students design a physical community and program Indi or Dash robots to navigate it while learning about needs and wants.
Activities:

- Brainstorm and design a community
- Build using classroom materials
- Code programmable devices to visit locations
- Debug and revise paths
- Present projects to the class

Unit 3: Earthbots – Green Design Challenge

Classes: 4 | **Type:** STEM
Students will explore environmental issues and apply the engineering design process to build Earth-friendly robots ("Earthbots") using recyclable materials to address a specific problem.
Standards: 8.2.2.ETW.1–4, 8.2.2.NT.1–2, K-2-ETS1-1
Students learn about real-world environmental challenges and how engineers use innovation to help the planet. They design and construct Earthbots from recyclable materials, focusing on function and environmental impact.
Activities:

- Identify a local environmental issue
- Design and build Earthbots from recyclables
- Share the function and message of each Earthbot

Unit 4: Mealworm Hotels

Classes: 4 | **Type:** STEM

Students will observe live organisms (mealworms), collect data on their behavior, and use the engineering design process to create and refine habitats that meet their needs.

Standards: 8.1.2.DA.1–4, K-2-ETS1-1 to ETS1-3

Students build a habitat for live organisms and track behavioral patterns and needs.

Activities:

- Observe mealworms and take notes
- Design and construct a habitat
- Chart behavior in each space
- Analyze and revise the habitat design

Unit 5: Towers & Structures

Classes: 2 | **Type:** STEM

Students will work collaboratively to plan, build, and evaluate tower structures using a variety of materials, with a focus on stability, height, and the impact of material choices.

Standards: 8.2.2.ED.3, 8.2.2.ITH.4

Students explore how different materials and building techniques affect the strength and height of towers. Students collaborate to build and evaluate towers, focusing on stability and materials.

Activities:

- Discuss structure and material choices
- Group tower-building challenge

Unit 6: Introduction to Algorithms

Classes: 4 | **Type:** Technology

Students will understand what algorithms are and how they are used in everyday life and computer programming. They will practice creating and following algorithms through unplugged activities and block-based coding platforms.

Standards: 8.1.2.AP.1–4, 8.1.2.DA.3

Students explore algorithms and coding through unplugged and digital activities.

Activities:

- Write an algorithm for brushing teeth
- Unplugged coding games with movement
- Practice loops using Code.org and Kodables
- Debug sequences and fix errors

Unit 7: Data Detectives

Classes: 2 | **Type:** Technology

Students collect, represent, and analyze data to find patterns and make predictions.

Standards: 8.1.2.DA.1–4

Students will survey classmates, organizing data, and creating visual representations such as bar and picture graphs. They will explore how data helps us make decisions and find patterns in everyday information.

Activities:

- Survey classmates (e.g., favorite food)
- Create bar and picture graphs

- Identify trends and make predictions

Unit 8: Inventor's Workshop

Classes: 4 | **Type:** STEM

Students explore how tools work by taking them apart, then brainstorm and sketch improvements.

Standards: 8.2.2.NT.1–2, 8.2.2.ED.1, K-2-ETS1-2, ETS1-3

Students act as young inventors by investigating how everyday tools and toys function. Through hands-on exploration and creative thinking, they learn about internal mechanisms and apply their ideas to redesign or improve objects.

Activities:

- Take apart old toys or tools
- Sketch and label internal parts
- Design and sketch an improved version

Unit 9: Design for Good – Community Solutions

Classes: 4 | **Type:** STEM

Students collaborate to solve a real-world problem through a design protype and presentation.

Standards: 8.2.2.ITH.5, 8.2.2.EC.1

Students become problem-solvers by identifying issues that impact their community or the world. Through collaboration, research, and creativity, they design and build innovative prototypes that aim to make a positive difference, culminating in a team presentation to share their solutions.

Activities:

- Choose a community or global issue
- Brainstorm and research solutions
- Build a prototype using STEM materials
- Present the design as a team

Third Grade

Unit 1: Life Cycle Engineering

Classes: 4 | **Type:** STEM/Technology

Students will explore the life cycles of plants and animals through science, coding and engineering. They model life cycle stages and create moving representations through hands-on tools and technology.

Standards: 8.2.5.ED.1, 8.2.5.ED.4, 8.2.5.ETW.2

Students will research the stages of plant or animal life cycles, build interactive models using LEGO WeDo kits, and create digital sequences using Makey Makey and Scratch.

Activities:

- Research and diagram a plant or animal life cycle
- Program a life cycle sequence using Makey Makey and Scratch
- Build moving models of life cycles using LEGO WeDo kits

Unit 2: Roller Coaster Challenge

Classes: 4 | **Type:** STEM

Students investigate motion and force by designing and building roller coasters. They test and refine marble runs while learning about kinetic and potential energy.

Standards: 8.2.5.ED.2, 8.2.5.ED.4

Using marbles and recycled materials, students apply their understanding of potential and kinetic energy to create marble runs that demonstrate speed, distance, and gravity's effects.

Activities:

- Explore potential and kinetic energy concepts
- Design and construct marble runs using recycled materials
- Test and revise roller coasters for speed and distance

Unit 3: Passion Projects

Classes: 5 | **Type:** STEM/Technology

Students will research and develop a project based on a topic of personal interest. Through the design process, they create a product or presentation that reflects their learning and creativity.

Standards: 8.2.5.ED.1–5, 8.1.5.AP.1, 3-5-ETS1-1

Students choose a topic they are passionate about and bring it to life through research, planning, and creative design.

Activities:

- Research using digital and print resources
- Organize ideas and create an outline
- Build a prototype, visual display, or digital presentation

Unit 4: Game Coding with Scratch

Classes: 4 **| Type:** Computer Science

Students will use block-based coding to design interactive games. They explore programming concepts like loops, variables, and events to build functional, playable games.

Standards: 8.1.5.AP.1–4, 8.1.5.DA.3

Students learn block-based coding in Scratch to create interactive games and apply programming concepts.

Activities:

- Explore the Scratch platform and interface
- Learn to use events, variables, and loops
- Design and program an original game with win/lose conditions

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Unit 5: Graphing and Pixel Art with Google Sheets

Classes: 4 | **Type:** Data & Technology

Students collect and visualize data using spreadsheets. They learn basic graphing skills and apply formatting techniques to create pixel art in Google Sheets.

Standards: 8.1.5.DA.1–4

Students use spreadsheets to organize data, create graphs, and design pixel art by formatting cells.

Activities:

- Input and organize survey data in Sheets
- Create bar and line graphs
- Design a pixel art image by coloring spreadsheet cells

Unit 6: Digital Citizenship

Classes: 2 | **Type:** Digital Citizenship

Students will develop awareness of online safety, privacy, and respectful behavior.

Standards: 8.1.5.NI.1–3, 8.1.5.IC.1

Students will learn how to be responsible citizens in a digital world.

Activities:

- Participate in an interactive Interland lesson
- Discuss digital safety scenarios and behaviors
- Role-play real-life situations for safe online choices

Unit 7: Forces, Balance, and Stability

Classes: 4 | **Type:** STEM

Students explore the principles of balance and stability through engineering challenges. They build and test structures for strength and resilience.

Standards: 3-5-ETS1-2

Students investigate balance and stability by designing, building, and testing structures to withstand weight and movement, then improving their designs based on results.

Activities:

- Build structures designed to withstand weight or shaking
- Test materials for strength and revise designs
- Analyze and compare tower stability across trials

Unit 8: Crayfish Habitat and Adaptation Engineering

Classes: 3 | **Type:** STEM & Life Science

Students apply science and engineering to design model habitats for crayfish. They study animal adaptions and environmental changes to guide their creations.

Standards: 8.2.5.ETW.1

Students study crayfish traits and behaviors to design and build a model habitat that supports their survival and adapts to environmental changes.

Activities:

- Observe and discuss crayfish traits and survival needs
- Design and build a model habitat
- Explore adaptation ideas for environmental change

Unit 9: Inventor's Workshop – Simple Machines

Classes: 5 | **Type:** STEM & Engineering

Students explore simple machines and invent tools or devices that solve real-world problems. They use hands-on materials and design thinking throughout the process.

Standards: 3-5-ETS1-3

Students explore simple machines and apply the design process to invent and build prototypes that solve real-world problems.

Activities:

- Investigate levers, pulleys, wheels, and inclined planes
- Plan and sketch an invention using simple machines
- Build, test, and present a prototype invention
