Mendham Township Elementary School

Computer Science and Design Thinking Curriculum

K-4

Vision: To empower all students to become confident and creative users of technology, preparing them to thrive in a digital world.

Mission: To provide a comprehensive technology curriculum that integrates seamlessly with core subject areas, fostering critical thinking, collaboration, and problem-solving skills, enabling students to be creators and innovators.

Guiding Principles:

- **Integration:** Technology will be integrated across all subject areas, not taught as a standalone subject.
- **Collaboration:** Grade-level teams and the technology teacher will collaborate to design and align technology activities and projects with core subject matter and standards.
- **Real-World Application:** Technology skills will be applied to solve real-world problems and to synthesize information to make informed decisions.
- **Digital Citizenship:** Students will learn how to be safe, responsible, and ethical digital citizens.
- **Equity and Access:** All students will have equitable access to technology and opportunities to develop their technology skills.

Kindergarten

- **Unit 1: Basic Computer Operations**
    - Essential Question: What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
    - Skills:
        - Use basic computer vocabulary
        - Identify major parts of a computer
        - Use input and output devices appropriately
        - Begin using home row keyboarding skills
        - Access different programs and features using a mouse and keyboard
        - Turn computers on and off
        - Access printers

2020 NJSLS-CSDT Standards:

8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences2.

8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems

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

    - Activities:
        - Use graphic organizing software to plan a story
        - Introduction to Microsoft Word
        - Operate frequently used, high-quality, interactive games or activities in either screen or toy-based formats

- **Unit 2: Digital Tools and Resources**
    - Essential Questions:
        - How does the use of digital tools and media-rich resources enhance creativity and the construction of knowledge?
        - In what ways do digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems?
        - In what ways do technology products and systems impact every aspect of the world in which we live?
    - Skills:
        - Use a digital camera to take a picture
        - Illustrate and communicate original ideas and stories using digital tools and media-rich resources
        - Use a graphic organizer to plan a story
        - Use appropriate software to create an original story
        - Use Microsoft Word to type a short original story

2020 NJSLS-CSDT Standards:

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.IC.1: Compare how individuals live and work before and after the implementation of new computing technology.

8.2.2.ED.1: Communicate the function of a product or device.

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.

8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.

8.2.2.ITH.3: Identify how technology impacts or improves life.

- Lesson Activities:

Lesson 1: Capturing Ideas with a Digital Camera

Objective: Students will be able to use a digital camera to take pictures and understand how it captures information.

●Activity 1: Exploring the Digital Camera

○Introduce a digital camera to the students, discussing its parts (lens, button, screen).

○Explain that the camera can store pictures, which is a way of keeping information.

●Activity 2: Taking Pictures

○Have the students practice using the digital camera to take pictures of objects in the classroom, including plants, toys, and friends.

○Guide the students to focus on what they want to show in their picture.

●Activity 3: Sharing and Discussing Pictures

○Project the pictures onto a screen.

○Have students share what they photographed and why they chose to capture those images.

●**Assessment**: Observe students' ability to use a digital camera and discuss their images.

Lesson 2: Planning Stories with a Graphic Organizer

Objective: Students will use a graphic organizer to plan the different elements of their story.

●Activity 1: What is a Graphic Organizer?

○Introduce the concept of a graphic organizer, such as a simple storyboard, and explain that it helps plan the parts of a story.

○Explain that a graphic organizer is a way of organizing the sequence of ideas for the story.

●Activity 2: Planning a Story

○Have students use a graphic organizer (e.g., a simple 3-part storyboard with boxes for beginning, middle, and end).

○Provide a theme (e.g., "A Day at the Park," or "My Favorite Animal") and have students draw simple pictures or use symbols to represent what might happen in each part of the story.

●Activity 3: Sharing Story Plans

○Students will share their story plans with a partner, explaining what their story is about using their graphic organizer.

●**Assessment**: Observe students' ability to use a graphic organizer to plan a story and explain the planned events6.

Lesson 3: Creating Stories Using Digital Tools

Objective: Students will illustrate and communicate their original ideas by creating a story using digital tools.

●Activity 1: Introduction to Story Software

○Introduce a child-friendly drawing or story creation software on computers or tablets.

○Show students how they can add simple drawings, text, or voice recordings to create a digital story.

●Activity 2: Building Digital Stories

○Using their graphic organizers, students create their stories using digital tools, combining their drawings and text or voice recordings.

○Explain that this allows them to express their ideas and communicate them to others.

●Activity 3: **Sharing Digital Stories**

○Have the students share their digital stories in small groups, or with the whole class.

●**Assessment**: Evaluate students' ability to use software to create a story and share their ideas.

Lesson 4: Typing Short Stories Using Microsoft Word

Objective: Students will learn to use Microsoft Word to type their short stories.

●**Activity 1**: **Introduction to Microsoft Word**

○Introduce Microsoft Word, explaining the basic functions, including typing and using the spacebar.

●**Activity 2**: **Typing a Simple Story**

○Have students type a short, original story based on one they've already developed in the previous lessons.

○Help them with basic typing skills (locating letters and using the spacebar).

○Students can describe the characters and settings for their story.

●**Activity 3**: **Sharing Typed Stories**

○Have the students share their stories with the class, either displayed on the screen or printed out.

●**Assessment**: Observe students' ability to use Microsoft Word to type a short story

- **Unit 3:**
  - Essential Questions:
    - In what ways do technological advancements create societal concerns regarding the practice of safe, legal, and ethical behaviors? How can a student use digital tools to assist in gathering and managing information? How can using digital tools assist in generating solutions and making decisions?
  - Skills:
    - Model legal and ethical behaviors by citing resources.
    - Use the Internet to explore information with teacher support.
    - Navigate basic browser functions

2020 NJSLS-CSDT Standards:

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 others13.

8.1.2.NI.4: Explain why access to devices needs to be secured13.

8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats8.

8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device14.

- **Lesson Activities:**

  Lesson 1: Introduction to Safe and Ethical Online Behavior

  Objective: Students will understand the importance of being safe and ethical when using digital tools and resources.

  - **Activity 1: "Our Digital Playground"**

  Introduce the idea that using digital tools is like playing in a playground; there are rules to keep everyone safe and happy.

  Discuss the idea of being responsible and kind in the digital world, just like in the real world.

  - **Activity 2: "Safe Sharing" Discussion**

  Engage the students in a discussion about sharing information with others.

  Explain that some information, like passwords and personal details, should be kept private to protect them.1

  - **Activity 3: "The Trusted Adult"**

  Explain the importance of talking to a trusted adult (teacher, parent) if they encounter something online that makes them feel uncomfortable or confused.

  Assessment: Observe students' understanding of safe online behavior and their ability to identify trusted adults.

  Lesson 2: Exploring the Internet with Teacher Support

  Objective: Students will use the internet to explore information with teacher support.

  - **Activity 1: "Guided Internet Exploration"**

  Using a classroom computer or interactive whiteboard, show students how to navigate a web browser with teacher support.

  Model how to use the browser to access a preselected, child-friendly website.

  - **Activity 2: "Picture Hunt"**

  Have the students engage in a “picture hunt” activity.

  Explain that they will use the provided website and search for specific images or information, such as animals or colors, under the guidance of the teacher.

- **Activity 3: Sharing and Discussing Findings**

After the picture hunt, discuss the images or information the students found.

Ask students how the internet helped them discover these new things.

Assessment: Observe students' ability to navigate a web browser with teacher guidance and use the internet to find information.

Lesson 3: Modeling Legal and Ethical Behavior Online

Objective: Students will model legal and ethical behaviors by citing resources.

- **Activity 1: "Who Made This?"**

Discuss the idea that people create the content we see online (pictures, videos, stories, etc.).

Emphasize that it is important to acknowledge and respect the work of others.

- **Activity 2: "Citing Sources"**

Introduce the idea of citing a source when using information or pictures found online.

Explain how to give credit to the creator, even at a basic level, by simply saying “I found this on the website” or “This picture was made by (name).”

- **Activity 3: Practice Citing Sources**

Using images they found online in the previous activity, have them state the source of the image.

Assessment: Evaluate students' ability to cite sources when using information or pictures found online.

- **Lesson 4: Navigating Basic Browser Functions**

Objective: Students will learn to navigate basic browser functions.

- **Activity 1**: **Introducing Browser Buttons**

Introduce basic browser functions like the back, forward, refresh, and home buttons.

- **Activity 2**: **Practice Using Browser Functions**

Have students practice using the buttons to navigate different pages on the provided website.

Begin on the home page of the site and have the students go back and forth to different pages using the back and forward buttons.

- **Activity 3**: **Teacher-Led Navigation**

Guide students through navigating the website and have them practice using browser functions to move through it.

Assessment: Observe students' ability to navigate a website using basic browser functions.

Integrated Accommodations and Modifications for Students with IEP/504/ELL and G&T:

IEP/504

- Provide visual aids and simplified instructions.
- Offer extra time for activities.
- Pair students with peer support as needed.

ELL

- Use visuals and gestures to support communication.
- Provide sentence frames to support discussions.
- Use simple language for explanations.
- Use simple language for explanations.

G&T

- Encourage students to explore other ways to connect, like satellite connections.
- Challenge them to explain the different kinds of security measures, like passwords, to other students.
- Allow students to create a role play that describes the connections, the security measures, and how we use the internet to share ideas.

List of Core Instructional and Supplemental Materials

- Pictures and videos of people using computers, tablets, and phones
- Globe or map

●Drawing materials

●Simple props for role-playing

Interdisciplinary Connections

●Social Studies: Connect to discussions about families and communities around the world.

●Language Arts: Practice verbal communication during discussions and explaining drawings.

Art: Express understanding through drawings and other visual representations.

Integration of 21st Century Skills and Life/Career Standards

●Communication and Collaboration: Students collaborate during discussions and activities.

●Information Literacy: Students learn how technology connects people to information.

●Social and Cross-Cultural Skills: Students begin to learn about connecting to others around the world.Integration of Technology Standards:

●Students will begin to understand the uses of digital devices in daily life.

●Students will start to explore ways that technology helps them connect with others.

First Grade

- **Unit 1: Building Foundational Skills**
    - Essential Question: What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
    - Skills:
        - Use technology terms in daily practice
        - Create a document with text, pictures, and other age-appropriate formatting options using a word-processing program
        - Demonstrate the ability to navigate in developmentally appropriate virtual environments
        - Illustrate and communicate original ideas and stories using digital tools and media-rich resources
        - Practice touch typing

2020 NJSLS-CSDT Standards:

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.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.IC.1: Compare how individuals live and work before and after the implementation of new computing technology.

- **Lesson Activities:**

  Lesson 1: Introduction to Technology Terms

  Objective: Students will learn and use basic technology terms in daily practice.

- **Activity 1: "Tech Term Treasure Hunt"**

Introduce basic technology terms (e.g., computer, keyboard, mouse, screen, program, icon).

Hide labeled cards with these terms around the classroom.

Have students find the cards and discuss what each term means.

- **Activity 2: "Tech Term Charades"**

Students act out different technology terms, and classmates guess the term being acted out.

- **Activity 3: "Technology Term Matching"**

Match pictures of technology with their corresponding terms.

Assessment: Observe students' ability to use technology terms correctly in discussions and activities.

Lesson 2: Creating Documents with a Word Processor

Objective: Students will create a document with text, pictures, and other age-appropriate formatting options using a word-processing program.

- **Activity 1: "Introduction to Word Processing"**

Introduce a simple, age-appropriate word-processing program.

Show students how to type basic text and use the space bar and enter key.

- **Activity 2: "Adding Pictures"**

Demonstrate how to insert pictures or simple shapes into the document.

Have students add pictures or shapes related to a theme.

- **Activity 3: "Formatting Fun"**

Introduce basic formatting options, such as changing font size and color.

Have students use these formatting options in their documents.

Assessment: Evaluate students' ability to create a document with text, pictures, and basic formatting options.

Lesson 3: Navigating Virtual Environments

Objective: Students will demonstrate the ability to navigate in developmentally appropriate virtual environments.

- **Activity 1: "Virtual Tour"**

Introduce a simple, age-appropriate virtual environment, such as an educational game or virtual world.

Guide students through the basic navigation controls (e.g., clicking on objects, using arrow keys, if available).

- **Activity 2: "Exploration Time"**

Allow students to explore the virtual environment independently, with teacher guidance.

Encourage them to describe what they see and how they are navigating.

- **Activity 3: "Virtual Scavenger Hunt"**

Have students use their navigation skills to complete a virtual scavenger hunt.

Assessment: Observe students' ability to navigate a virtual environment and use navigation controls effectively.

Lesson 4: Expressing Ideas with Digital Tools

Objective: Students will illustrate and communicate original ideas and stories using digital tools and media-rich resources.

- **Activity 1: "Digital Storytelling"**

Introduce digital tools such as drawing programs or simple animation software.

Provide a prompt for a short story or idea.

- **Activity 2: "Creating Media-Rich Stories"**

Have students create digital drawings or animations to illustrate their ideas or stories.

Help students add media such as text or sound to enhance their stories.

- **Activity 3: "Sharing and Discussing Digital Stories"**

Have students share their digital stories with classmates and discuss their creations.

Assessment: Evaluate students' ability to create and communicate original ideas using digital tools and media-rich resources.

Lesson 5: Introduction to Touch Typing

Objective: Students will practice touch typing using an age-appropriate program or website.

- **Activity 1: "Keyboard Basics"**

Introduce the home row keys and explain proper hand placement.

- **Activity 2: "Touch Typing Practice"**

Use an age-appropriate touch typing program or website to introduce touch typing to the students.

Have the students complete simple exercises to practice finger placement and key locations.

- **Activity 3: "Typing Games"**

Have students play typing games to encourage practice and to reinforce concepts.

Assessment: Observe students' ability to practice correct finger placement on the keyboard and their progress toward touch typing.

Unit 2: Digital Tools for Communication and Collaboration

- Essential Questions:
  - In what ways do digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems?
  - In what ways do technological advancements create societal concerns regarding the practice of safe, legal, and ethical behaviors?
  - What are the effective uses of digital tools that will assist in gathering and managing information?
  - In what ways do technology products and systems impact every aspect of the world in which we live?
- Skills:
  - Use technology terms in daily practice
  - Access materials on external and internal storage devices (e.g., CDs, flash drives, hard drives)

- Create a document with text, pictures, and other age-appropriate formatting options using a word-processing program
- Save information in appropriate areas
- Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using electronic tools
- Model legal and ethical behaviors when using both print and non-print information by citing resources
- Use digital tools and online resources to explore a problem or issue affecting children, and discuss possible solutions

2020 NJSLS-CSDT Standards:

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.

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 needs to be secured.

8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats8.

Lesson Activities:

Lesson 1: Review of Technology Terms and Introduction to Storage Devices

Objective: Students will review basic technology terms and learn about internal and external storage devices.

●Activity 1: "Tech Term Review"

○Review basic technology terms from Unit 1 (e.g., computer, keyboard, mouse, screen, program, icon).

○Have students play "Tech Term Bingo" using the terms.

●Activity 2: "Storage Device Exploration"

○Introduce different types of storage devices (e.g., computer hard drive, flash drive, CD).

○Show how to access and identify materials on these storage devices.

●**Activity 3: "Organizing Data"**

○Practice saving files in specific areas on the computer, such as a folder for a particular project.

●**Assessment:** Observe students' ability to use technology terms correctly and their understanding of storage devices and where to access files on them.

Lesson 2: Digital Communication and Collaboration

Objective: Students will engage in learning activities with students in other classes, schools, or countries using electronic tools.

●**Activity 1: "Virtual Classroom Connection"**

○Use a video conferencing tool to connect with another class.

○Have students introduce themselves and share something they have learned.

●**Activity 2: "Collaborative Project"**

○Engage in a collaborative activity with students from another class, such as creating a shared digital drawing or telling a group story together using an online tool.

●**Activity 3: "Sharing Experiences"**

○Have students share experiences of digital learning and collaboration.

●**Assessment:** Evaluate students' ability to use digital tools to communicate and collaborate with others and assess their understanding of how these tools connect people.

Lesson 3: Ethical Use of Digital Information

Objective: Students will model legal and ethical behaviors when using both print and non-print information by citing resources.

●**Activity 1: "Using Information Ethically"**

○Explain the importance of citing resources when using information (e.g., acknowledging where pictures or text come from).

○Introduce the concept of plagiarism and why it is important to use original work.

●**Activity 2: "Citing Resources"**

○Model how to cite resources when using information in a digital document using a very simple method, like stating "I got this picture from.."

○Have students practice adding simple citations to their work.

●Activity 3: "Class Discussion"

○Have a class discussion about the appropriate use of information found on the internet.

●Assessment: Evaluate students' ability to appropriately cite resources, demonstrating an understanding of legal and ethical behaviors.

Lesson 4: Using Digital Tools to Explore Problems

Objective: Students will use digital tools and online resources to explore a problem or issue affecting children and discuss possible solutions.

●Activity 1: "Problem Exploration"

○Use an online resource to present a simple problem that children face, such as playground safety or pollution.

○Discuss the problem as a class and brainstorm some of its causes.

●Activity 2: "Research Solutions"

○Guide students to use age-appropriate online resources to research solutions to the problem.

○Model the use of digital tools and resources for researching information.

●Activity 3: "Discuss Possible Solutions"

○Have the students engage in a class discussion to share possible solutions and suggest how technology might help.

●Assessment: Observe students' ability to use digital tools to explore problems and come up with potential solutions.

Lesson 5: Impact of Technology on the World

Objective: Students will discuss the impact of technology on the world.

●Activity 1: "Technology in Daily Life"

○Discuss various ways technology is used in the world.

○Have students brainstorm different technologies used to solve problems in daily life.

●Activity 2: "Positive and Negative Impacts"

○Discuss the positive and negative impacts of technology (e.g., how it has changed communication, created new jobs, or had a negative effect on the environment).

●Activity 3: "Class Discussion" * Have a class discussion about different views on the impact of technology.

●Assessment: Evaluate students' understanding of the impact of technology on the world, both positive and negative.

- **Unit 3: Digital Tools for Problem Solving and Innovation**
  - Essential Questions:
    - How can students access information using digital tools to assist in generating solutions and making decisions?
    - How does the use of technology products and systems impact every aspect of the world in which we live?
    - How does the design process help students solve problems?
  - Skills:
    - Navigate the basic features of a browser independently
    - Type 4 words per minute
    - Begin to be able to describe how technology products, systems, and resources are useful at school
    - Brainstorm and devise a plan to repair a broken toy or tool using the design process

2020 NJSLS-CSDT Standards:

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

8.2.2.ED.1: Communicate the function of a product or device.

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.

8.2.2.ITH.3: Identify how technology impacts or improves life.

Lesson Activities:

Lesson 1: Introduction to Web Browsers and Basic Navigation

Objective: Students will learn to navigate the basic features of a browser independently.

●Activity 1: "Browser Exploration"

○Introduce the concept of a web browser and its basic features (e.g., address bar, back and forward buttons, search bar).

○Use an interactive whiteboard to demonstrate how to navigate to a website using an address.

●Activity 2: "Practice Navigation"

○Have students practice navigating to a few teacher-selected age-appropriate websites using the browser's basic features.

○Use kid-friendly web browsers and search engines to keep the environment safe and easy to navigate.

●Assessment: Observe students' ability to use the browser's basic features to navigate to different web pages independently.

Lesson 2: Basic Typing Skills

Objective: Students will begin to develop basic typing skills.

●Activity 1: "Keyboard Familiarization"

○Introduce the layout of a computer keyboard and the home row keys.

○Use a fun keyboarding game to practice letter recognition.

●Activity 2: "Typing Practice" * Practice typing simple words using an age-appropriate typing program or online game. * Time for students to see how many words they can type per minute. * Set a goal of four words per minute.

●Assessment: Observe students' typing speed and accuracy and their ability to type four words per minute.

Lesson 3: Technology in the Classroom

Objective: Students will be able to describe how technology products, systems, and resources are useful at school.

●Activity 1: "Classroom Technology Tour"

○Take a tour of the classroom and identify different technology products, systems, and resources.

○Discuss the purpose of each technology and how it helps in the classroom.

●Activity 2: "Technology Benefits"

○Have students brainstorm and discuss how these technologies are useful at school and home.

○Record their answers on chart paper, using both words and pictures.

●Assessment: Evaluate students' ability to identify and describe the usefulness of various technology resources in the classroom.

Lesson 4: Introduction to the Design Process

Objective: Students will be introduced to the design process and use it to solve a problem.

●Activity 1: "Brainstorming Session"

○Discuss what it means to brainstorm, focusing on idea generation.

○Have students brainstorm some simple problems.

●Activity 2: "Design Challenge"

○Present a simple problem, such as a broken toy or a tool that isn't working.

○Guide students to brainstorm solutions using a simple model of the design process (ask, imagine, plan, create, improve)12.

●Activity 3: "Devising a Plan" * In small groups, have students choose a problem, devise a simple plan using the design process, and sketch their solution.

●Assessment: Evaluate students' understanding of the design process and their ability to brainstorm and devise a simple plan to solve a problem.

Lesson 5: Repairing a Toy or Tool

Objective: Students will brainstorm and devise a plan to repair a broken toy or tool using the design process1.

●**Activity 1: "Plan Implementation"** * Provide students with a broken toy or tool and some simple materials they can use to try and fix it. * Have students follow their simple plans, created in Lesson 4, to attempt a repair of the toy or tool[1][2].

●**Activity 2: "Reflect and Share"** * After attempting the repair, have students reflect on the process and what they learned and share their experience with the class. * Use the design process to discuss what worked and what they might do differently next time[1][2].

●**Assessment:** Evaluate students' ability to implement their plan, use the design process, and how well they reflect on the process.

Integrated Accommodations and Modifications for Students with IEP/504/ELL and G&T:

IEP/504

- Provide visual aids and simplified instructions.
- Offer extra time for activities.
- Pair students with peer support as needed.

ELL

- Use visuals and gestures to support communication.
- Provide sentence frames to support discussions.
- Use simple language for explanations.
- Use simple language for explanations.

G&T

- Encourage students to explore other ways to connect, like satellite connections.
- Challenge them to explain the different kinds of security measures, like passwords, to other students.
- Allow students to create a role play that describes the connections, the security measures, and how we use the internet to share ideas.

List of Core Instructional and Supplemental Materials

●Pictures and videos of people using computers, tablets, and phones

●Globe or map

●Drawing materials

●Simple props for role-playing

Interdisciplinary Connections

●Social Studies: Connect to discussions about families and communities around the world.

●Language Arts: Practice verbal communication during discussions and explaining drawings.

Art: Express understanding through drawings and other visual representations.

Integration of 21st Century Skills and Life/Career Standards

●Communication and Collaboration: Students collaborate during discussions and activities.

●Information Literacy: Students learn how technology connects people to information.

●Social and Cross-Cultural Skills: Students begin to learn about connecting to others around the world.Integration of Technology Standards:

●Students will begin to understand the uses of digital devices in daily life.

●Students will start to explore ways that technology helps them connect with others.

Second Grade

- **Unit 1: Expanding Digital Skills and Citizenship**
    - Essential Questions:
        - What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
        - How can using digital tools and media-rich resources enhance creativity and the construction of knowledge?
        - What societal concerns regarding the practice of safe, legal, and ethical behaviors do technological advancements create?
        - How can using digital tools effectively assist a student in gathering and managing information?
        - How do technology products and systems impact every aspect of the world in which we live?
        - What is the design process and how can it be used to systematically solve a problem?
    - Skills:
        - Use basic computer vocabulary in daily practice
        - Type 4 words per minute
        - Demonstrate the ability to navigate in developmentally appropriate virtual environments
        - Create a document with text formatting and graphics using a word processing program
        - Determine the benefits of a wide range of digital tools by using them to solve problems
        - Illustrate and communicate original ideas and stories using digital tools and media-rich resources
        - Explain the need for each individual, as a member of the global community, to practice cyber safety, cyber security, and cyber ethics using existing and emerging technologies
        - Use digital tools and online resources to explore a problem or issue affecting children, and possible solutions
        - Describe how technology products, systems, and resources are useful at school, home, and work

2020 NJSLS-CSDT Standards:

8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences2.

8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems2.

8.1.2.NI.1: Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network7.

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 others13.

8.1.2.IC.1: Compare how individuals live and work before and after the implementation of new computing technology8.

8.2.2.ED.1: Communicate the function of a product or device9.

8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process9.

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 together10.

8.2.2.ITH.3: Identify how technology impacts or improves life11.

8.2.2.ETW.4, 8.2.2.EC.11234....

Lesson Activities:

Lesson 1: Basic Computer Vocabulary

Objective: Students will use basic computer vocabulary in daily practice.

●Activity 1: "Tech Terms"

○Introduce basic computer vocabulary (e.g., hardware, software, mouse, keyboard, monitor, browser, internet)12.

○Use flashcards with images and definitions to support understanding.

●Activity 2: "Vocabulary in Action"

○Have students use the terms as they work on computers and discuss their use in a whole-class setting.

●**Assessment:** Observe and assess students' correct use of computer vocabulary during discussions and activities.

Lesson 2: Typing and Keyboard Skills

Objective: Students will continue to develop basic typing skills, aiming for 4 words per minute.

●**Activity 1: "Keyboard Review"**

○Review the keyboard layout, emphasizing the home row keys.

○Use a keyboarding game for letter recognition.

●**Activity 2: "Timed Typing"**

○Students practice typing simple words and sentences using an age-appropriate program, aiming for a speed of four words per minute[13].

○Time students regularly and have them record their progress.

●**Assessment:** Track students' typing speed and accuracy using the program, and observe their consistency in typing four words per minute.

Lesson 3: Navigating Virtual Environments

●**Objective:** Students will demonstrate the ability to navigate in developmentally appropriate virtual environments.

●**Activity 1: "Virtual Tour"** * Introduce different virtual environments such as educational websites or interactive games. * Model how to navigate these spaces using a browser and a variety of navigation tools.

●**Activity 2: "Guided Practice"**

○Have students practice navigating to different areas of a selected virtual space, while discussing how the navigation tools help them move around[2].

●**Assessment:** Observe students' ability to independently navigate in the virtual environments and use the tools.

Lesson 4: Introduction to Word Processing

Objective: Students will create a document with text formatting and graphics using a word processing program.

●Activity 1: "Word Processing Basics"

○Introduce the basic features of a word processing program such as text entry, formatting options (font, size, color), and inserting graphics.

○Model how to create a simple document.

●Activity 2: "Create a Document"

○Have students create a short document about themselves, using text formatting and inserting clip art or other graphics.

○Provide a checklist to remind students of the features they should use.

●Assessment: Evaluate students' ability to use the word processing program to create a document with text formatting and graphics.

Lesson 5: Benefits of Digital Tools

Objective: Students will determine the benefits of a wide range of digital tools by using them to solve problems.

●Activity 1: "Tool Time"

○Introduce a variety of digital tools, including search engines, drawing programs, and educational apps12.

○Discuss the purpose of each tool.

●Activity 2: "Problem Solving with Tools"

○Pose a simple problem, such as "How can we find information about animals?" or "How can we show our ideas visually?".

○Have students solve problems using a variety of appropriate digital tools.

●Assessment: Observe and assess how students use digital tools to solve problems and describe the benefits of these tools.

Lesson 6: Digital Storytelling

●**Objective:** Students will illustrate and communicate original ideas and stories using digital tools and media-rich resources.

●**Activity 1: "Story Starters"**

○Present story prompts and have students brainstorm ideas.

○Introduce the use of drawing and animation programs.

●**Activity 2: "Create a Digital Story"**

○Have students use a drawing or animation program to illustrate their story, adding text and voice-over if applicable.

○Encourage students to be creative and explore different methods of expressing their ideas.

●**Assessment:** Evaluate students' use of digital tools to create and communicate original stories, considering both their technical skills and creative expression.

Lesson 7: Cyber Safety, Security, and Ethics

Objective: Students will explain the need to practice cyber safety, cyber security, and cyber ethics using existing and emerging technologies.

●**Activity 1: "Digital Dilemmas"**

○Discuss scenarios about appropriate and inappropriate online behavior.

○Introduce key concepts such as keeping passwords private and not sharing personal information.

●**Activity 2: "Cyber Safety Rules"**

○Have students create posters or presentations with cyber safety rules.

○Discuss how to be responsible digital citizens.

●**Assessment:** Evaluate students' understanding of cyber safety, cyber security, and cyber ethics and their ability to apply this knowledge in digital activities.

Lesson 8: Exploring Problems and Solutions with Digital Tools

Objective: Students will use digital tools and online resources to explore a problem or issue affecting children, and propose possible solutions.

●**Activity 1: "Problem Identification"** * Discuss problems that might affect children such as bullying, pollution, or lack of access to resources, and show ways that these issues are being discussed online. * Brainstorm possible problems and issues to research using online resources.

●**Activity 2: "Research and Solutions"**

○Have students use digital tools to research their chosen problem and brainstorm possible solutions4.

○Discuss how different technologies might be used to help with these problems.

●**Assessment:** Evaluate students' ability to research a problem using digital tools and identify or propose solutions.

Lesson 9: Technology at Home, School, and Work

Objective: Students will describe how technology products, systems, and resources are useful at school, home, and work.

●**Activity 1: "Technology Around Us"**

○Discuss technology that is used at school, home, and at different workplaces.

○Brainstorm a list and categorize the different technologies.

●**Activity 2: "Technology Uses"**

○Have students create presentations or drawings to show how these different technologies are used.

○Discuss the impact that technology has had on their lives, and the lives of others.

●**Assessment:** Evaluate students' ability to describe how different technologies are useful at school, home, and work.

Lesson 10: The Design Process for Problem-Solving

Objective: Students will understand and apply the design process to systematically solve a problem.

●**Activity 1: "Design Process Review"**

○Review the steps of the design process: ask, imagine, plan, create, and improve.

○Use a simple design challenge to illustrate these steps.

●**Activity 2: "Solve a Problem"**

○Present students with a simple problem (e.g., how to carry multiple books easily, or how to pick up small pieces of trash) and have them work through the design process to develop a solution.

○Students may create simple prototypes using readily available materials.

●**Assessment:** Evaluate students' understanding and application of the design process through their work on a chosen problem.

Unit 2: Data Exploration and Communication

- Essential Questions:
  - What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
  - What societal concerns regarding the practice of safe, legal, and ethical behaviors do technological advancements create?
  - How can students access information through the use of digital tools that will assist them in generating solutions and making decisions?
  - How do information literacy skills, research, data analysis, and prediction provide the basis for the effective design of technology systems?
  - In what ways do digital tools facilitate local and global communication and collaboration in designing products and systems?
- Skills:
  - Type 6-8 words per minute
  - Create and present a simple spreadsheet, enter data, and interpret the information
  - Analyze the need for and use of copyrights
  - Use mapping tools to plan and choose alternate routes to and from various locations
  - Collect and post the results of a digital classroom survey about a problem or issue and use data to suggest solutions
  - Communicate with students in the United States or other countries using digital tools to gather information about a specific topic

2020 NJSLS-CSDT Standards:

8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems

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

8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.

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

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.

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.

8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.

Lesson 1: Keyboarding Practice and Data Entry

Objective: Students will improve keyboarding skills and learn basic data entry into a spreadsheet.

- **Activity:** Students engage in keyboarding games to increase their typing speed to 6-8 words per minute. They then practice entering data into a simple spreadsheet template1.

Assessment: Observe students' typing speed and accuracy. Review the data they input into the spreadsheet to check for correct placement and legibility.

Lesson 2: Interpreting Spreadsheet Data

Objective: Students will be able to interpret basic data presented in a spreadsheet and make simple predictions based on that data.

- **Activity:** Students analyze data previously entered into a spreadsheet. They identify the most frequent items, compare different data points, and create simple charts or graphs to make predictions1.

Assessment: Assess students' abilities to correctly identify patterns, trends, and to make predictions based on their interpretations of the charts and graphs.

Lesson 3: Understanding Copyright

Objective: Students will understand the concept of copyright and its importance in protecting digital creations.

- **Activity:** Use examples to explain how digital creations are made by people who have rights to them. Discuss what copyright means and why it's important to respect other people's creations. Students will brainstorm why it's important to respect intellectual property1.

Assessment: Observe students' understanding of copyright through class discussions and their ability to articulate why it is important.

Lesson 4: Mapping Tools and Routes

Objective: Students will use digital mapping tools to plan simple routes.

- **Activity:** Students explore digital mapping tools and use them to plan routes to and from locations and to identify alternate routes1.

Assessment: Assess students' abilities to effectively use mapping tools and to successfully plan and describe routes.

Lesson 5: Classroom Surveys and Data Collection

Objective: Students will collect and analyze data from a digital survey and use this data to suggest solutions.

- **Activity:** Students will participate in a classroom survey using digital tools, and then collect and present the data and analyze patterns to suggest solutions based on the results1.

Assessment: Assess students' abilities to collect survey data, present that data, and use the data to suggest solutions to a problem.

Lesson 6: Global Communication

Objective: Students will communicate with peers in different locations using digital tools to gather and share information.

- **Activity:** Students will use video conferencing or email to communicate with students in another location, asking and answering questions on a specific topic and sharing information1.

Assessment: Evaluate the students' use of communication tools and their ability to ask appropriate questions and share relevant information.

Integrated Accommodations and Modifications for Students with IEP/504/ELL and G&T:

IEP/504

- Provide visual aids and simplified instructions.
- Offer extra time for activities.
- Pair students with peer support as needed.

ELL

- Use visuals and gestures to support communication.
- Provide sentence frames to support discussions.
- Use simple language for explanations.
- Use simple language for explanations.

G&T

- Encourage students to explore other ways to connect, like satellite connections.
- Challenge them to explain the different kinds of security measures, like passwords, to other students.
- Allow students to create a role play that describes the connections, the security measures, and how we use the internet to share ideas.

List of Core Instructional and Supplemental Materials

●Pictures and videos of people using computers, tablets, and phones

●Globe or map

●Drawing materials

●Simple props for role-playing

Interdisciplinary Connections

●Social Studies: Connect to discussions about families and communities around the world.

●Language Arts: Practice verbal communication during discussions and explaining drawings.

Art: Express understanding through drawings and other visual representations.

Integration of 21st Century Skills and Life/Career Standards

●Communication and Collaboration: Students collaborate during discussions and activities.

●Information Literacy: Students learn how technology connects people to information.

●Social and Cross-Cultural Skills: Students begin to learn about connecting to others around the world.Integration of Technology Standards:

●Students will begin to understand the uses of digital devices in daily life.

●Students will start to explore ways that technology helps them connect with others.

Third Grade

- **Unit 1: Integrating Technology, Design Thinking, and Digital Citizenship**
    - Essential Questions:
        - What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
        - What societal concerns regarding the practice of safe, legal, and ethical behaviors do technological advancements create?
        - How can students access information through the use of digital tools that will assist them in generating solutions and making decisions?
        - In what ways do digital tools facilitate local and global communication and collaboration in designing products and systems?
    - Skills:
        - Type 6-8 words per minute
        - Create and present a simple spreadsheet, enter data, and interpret the information
        - Analyze the need for and use of copyrights
        - Use mapping tools to plan and choose alternate routes to and from various locations

2020 NJSLS-CSDT Standards:

8.1.5.CS.1: Model how computing devices connect to other components to form a system.

8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks.

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.2: Compare the amount of storage space required for different types of data.

8.1.5.AP.1: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

8.1.5.AP.2: Create programs that use clearly named variables to store and modify data.

Lesson 1: Introduction to Digital Tools and Typing

Objective: Students will identify different types of digital tools and practice basic typing skills.

Activity:

Introduce various digital devices (e.g., tablets, laptops, smartphones) and their common uses.

Engage students in a typing practice game or activity to improve speed and accuracy.

Assessment: Observe students as they identify devices and participate in the typing activity.

Lesson 2: Spreadsheets and Data Interpretation

Objective: Students will learn how to create a simple spreadsheet, enter data, and interpret the information.

Activity:

Introduce spreadsheet software and demonstrate how to input data.

Provide a simple data set (e.g., favorite colors, types of pets) and have students create their own spreadsheets and discuss findings.

Guide students to discuss their findings using the data in their spreadsheet.

Assessment: Collect student spreadsheets and observe students' ability to communicate the meaning of their data.

Lesson 3: Understanding Copyrights

Objective: Students will understand the need for and use of copyrights in digital content.

Activity:

Explain the concept of copyright using examples of creative works (e.g., pictures, music, stories).

Discuss why it is important to give credit to creators and ask permission to use their work.

Share examples of materials that can be used with permission or without.

Assessment: Students explain in their own words what copyright is and why we should respect it.

Lesson 4: Mapping Tools and Spatial Reasoning

Objective: Students will use mapping tools to plan and choose alternate routes to and from various locations.

Activity:

Introduce online mapping tools and their basic functions.

Have students use the tool to plan a route from home to school or to another familiar place.

Ask students to locate alternate routes and discuss their benefits and challenges.

Assessment: Students show and explain a route plan made with a digital mapping tool and alternative routes on the map.

Lesson 5: Digital Citizenship and Responsible Technology Use

Objective: Students will identify safe, legal, and ethical behaviors when using technology.

Activity:

Discuss the importance of online safety and security. This could include issues related to creating strong passwords and protecting private information.

Have students create guidelines for responsible technology use at school and home.

Discuss how technology has changed the way people live and work, both positively and negatively.

Assessment: Students can explain the benefits and risks of technology and identify at least three ways to be responsible for technology use.

Lesson 6: Collaboration and Communication with Digital Tools

Objective: Students will explore how digital tools can facilitate communication and collaboration.

Activity:

Explore online tools that allow students to share their work with a peer or partner.

Have students use a collaborative tool to create a presentation about an important issue or idea.

Facilitate a discussion about the benefits of using digital tools to collaborate and design a project.

Assessment: Observe how students interact with their peers using a digital collaborative tool.

- **Unit 2: Advanced Application and Ethical Use of Technology**
    - Essential Questions:
        - What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
        - How can using digital tools and media-rich resources enhance creativity and the construction of knowledge?
        - What societal concerns regarding the practice of safe, legal, and ethical behaviors do technological advancements create?
        - How can using digital tools effectively assist a student in gathering and managing information?
        - How do technology products and systems impact every aspect of the world in which we live?
    - Skills:
        - Type 8-10 words per minute
        - Create a document with text formatting and graphics using a word processing program to be used to construct a multimedia presentation
        - Illustrate and communicate original ideas and stories using digital tools and media-rich resources
        - Explain the need for each individual, as a member of the global community, to practice cyber safety, cyber security, and cyber ethics using existing and emerging technologies
        - Explain the purpose of an acceptable use policy and the consequences of inappropriate use of technology

- Model appropriate online behaviors related to cyber safety, cyberbullying, cyber security, and cyber ethics

2020 NJSLS-CSDT Standards:

8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.

8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.

8.1.5.IC.2: Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.AP.3: Create programs that include sequences, events, loops, and conditionals.

Lesson 1: Advanced Typing and Word Processing

Objective: Students will improve their typing speed and create a formatted document with text and graphics using a word processor1.

Activity:

Engage students in typing practice games and activities to increase speed and accuracy, aiming for 8-10 words per minute.

Introduce word processing software and guide students to add text, change fonts, insert images, and use other formatting tools.

Have students create a short story or descriptive paragraph with text formatting and relevant graphics.

Assessment: Observe students' typing speed and assess their ability to use formatting tools and graphics in their document.

Lesson 2: Digital Storytelling and Creative Expression

Objective: Students will illustrate and communicate original ideas and stories using digital tools and media-rich resources[1][2].

Activity:

Explore digital storytelling tools such as animation software, drawing apps, or presentation software that allows for images, audio, and text.

Have students create a digital story by combining text, images, and/or audio.

Students share their stories with each other and offer peer feedback.

Assessment: Evaluate students' ability to use digital tools to express their ideas creatively, and their ability to give and receive constructive feedback.

Lesson 3: Cyber Safety, Security, and Ethics

Objective: Students will explain why individuals must practice cyber safety, security, and ethics as members of the global community[3][4].

Activity:

Discuss cyber safety practices, such as keeping personal information private and creating strong passwords.

Explain the importance of cyber security, including protecting devices from malware, and using secure networks[5][6].

Introduce cyber ethics concepts, including respecting copyright and intellectual property, and avoiding plagiarism[7].

Students work together to create a short skit or presentation illustrating cyber safety and ethics best practices.

Assessment: Evaluate students' understanding of cyber safety, security, and ethics through class discussions and their presentation of scenarios that address those issues.

Lesson 4: Acceptable Use Policies and Responsible Technology

Objective: Students will understand the purpose of an acceptable use policy and consequences of inappropriate technology use[8][9][10].

Activity:

Discuss the purpose of acceptable use policies (AUPs) and why they are important in school and at home.

Guide students in a discussion to develop their own classroom AUP.

Discuss consequences for misuse of technology, such as cyberbullying or accessing inappropriate content, and how these relate to the AUP.

Assessment: Students will explain the purpose of an AUP and describe the consequences of breaking the policy in their own words.

Lesson 5: Modeling Appropriate Online Behaviors

Objective: Students will model appropriate online behaviors related to cyber safety, cyberbullying, cyber security, and cyber ethics[3][4].

Activity:

Present scenarios of online interactions, both positive and negative, that can include examples of cyberbullying, risky online interactions, sharing private information, etc.

Divide students into groups and have them model the appropriate responses to those scenarios.

Facilitate a whole class discussion about what students have learned about appropriate online behaviors.

Assessment: Evaluate students' ability to demonstrate appropriate online behaviors through their role-playing and their participation in the discussions.

Lesson 6: Technology's Global Impact

Objective: Students will understand how technology impacts the world[6][12].

Activity:

Discuss examples of how technology has improved various aspects of life, such as communication, productivity, and access to information.

Explore how technology has led to negative consequences, such as pollution or job loss.

Have students research a specific technological advancement or product and its global impact.

Students can present their findings using a digital media of their choosing.

Assessment: Evaluate students' research and their ability to analyze and explain technology's impact on the world.

- **Unit 3: Research, Problem Solving, and the Impact of Technology**
    - Essential Questions:
        - What knowledge of operations and related applications is a student required to have to begin the appropriate use of digital tools?
        - How can using digital tools effectively assist a student in gathering and managing information?
        - How can information accessed through the use of digital tools assist students in generating solutions and making decisions?
        - In what ways do technology products and systems impact every aspect of the world in which we live?
        - How can students use the design process to systematically solve a problem?
        - In what ways do information literacy skills, research, data analysis, and prediction provide the basis for the effective design of technology systems?
    - Skills:
        - Use basic computer vocabulary in daily practice
        - Type 10-14 words per minute
        - Determine the benefits of a wide range of digital tools by using them to solve problems
        - Evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks
        - Select and apply digital tools to collect, organize, and analyze data that support a scientific finding
        - Investigate factors that influence the development and function of technology products and systems
        - Design an alternative use for an existing product
        - Explain the positive and negative effects of products and systems on humans, other species, and the environment
        - Analyze responses collected from owners/users of a particular product and suggest modifications in the design of the product based on their responses

2020 NJSLS-CSDT Standards:

8.1.5.CS.3: Identify potential solutions for simple hardware and software problems using common troubleshooting strategies30.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data33.

8.1.5.AP.4: Break down problems into smaller, manageable sub-problems to facilitate program development42.

8.1.5.AP.5: Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program42.

8.1.5.AP.6: Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended42.

8.2.5.ED.1: Explain the functions of a system and its subsystems43.

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models43.

8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem44.

8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system

Lesson 1: Computer Vocabulary and Typing Skills

Objective: Students will use basic computer vocabulary and improve their typing speed to 10-14 words per minute.

Activity:

Introduce and review basic computer vocabulary (e.g., hardware, software, input, output, internet, etc.).

Incorporate the daily practice of computer vocabulary.

Use typing games and activities to improve typing speed and accuracy, focusing on reaching 10-14 words per minute.

Assessment: Evaluate students' use of computer vocabulary in discussions, and assess their typing speed.

Lesson 2: Digital Tools for Problem Solving

Objective: Students will determine the benefits of a wide range of digital tools by using them to solve problems.

Activity:

Introduce a variety of digital tools (e.g., calculators, online mapping tools, digital drawing tools).

Present real-world problems for students to solve using digital tools.

Have students explain which tools were most useful for solving specific problems and why.

Assessment: Evaluate students' ability to select and use appropriate digital tools for problem-solving and their ability to explain the usefulness of the tools they selected.

Lesson 3: Evaluating Information Sources

Objective: Students will evaluate the accuracy, relevance, and appropriateness of using print and non-print electronic information sources.

Activity:

Introduce the concept of information literacy.

Present a variety of sources, including books, websites, and videos that contain information on a single topic.

Guide students in evaluating the sources using a checklist that includes: accuracy, relevance, and appropriateness.

Students will discuss the pros and cons of each source.

Assessment: Observe students' ability to use the checklist to assess information sources.

Lesson 4: Data Collection and Analysis

Objective: Students will select and apply digital tools to collect, organize, and analyze data that support a scientific finding.

Activity:

Introduce a simple scientific question (e.g., which type of paper airplane flies the farthest?).

Demonstrate and have students use digital tools (e.g., spreadsheets, online graphing tools) to collect and organize data.

Have students analyze their data to support their findings.

Assessment: Evaluate the completeness and correctness of student data collection and their ability to analyze the data.

Lesson 5: Investigating Technology Products and Systems

Objective: Students will investigate factors that influence the development and function of technology products and systems.

Activity:

Have students select a technology product or system.

Have students research the materials, purpose, function, and development of their selected product.

Facilitate a group discussion where students share their research.

Assessment: Evaluate student research and participation in class discussion.

Lesson 6: Design Thinking: Alternative Use

Objective: Students will design an alternative use for an existing product.

Activity:

Introduce design thinking and the design process.

Have students select a product and brainstorm alternative uses.

Have students model or draw their new use, and present their ideas.

Assessment: Evaluate students' ability to use the design process to suggest an alternative use and demonstrate that idea.

Lesson 7: Impact of Technology on the World

Objective: Students will explain the positive and negative effects of products and systems on humans, other species, and the environment.

Activity:

Discuss and research both the positive and negative impacts of various technologies, such as transportation, communication, and manufacturing.

Have students consider the impact on humans, other species, and the environment.

Students can create a digital presentation to share their findings.

Assessment: Evaluate students' understanding of the positive and negative impacts of technology, and their ability to communicate their findings.

Lesson 8: Product Modification Based on User Feedback

Objective: Students will analyze responses collected from owners/users of a particular product and suggest modifications in the design of the product based on their responses.

Activity:

Students create a list of questions designed to gain information about the functionality of a product.

Students collect data using their survey questions.

Students analyze the data from their survey responses and suggest modifications to the product.

Assessment: Assess the students' ability to develop survey questions and their analysis of responses to make suggestions for improvement.

Integrated Accommodations and Modifications for Students with IEP/504/ELL and G&T:

IEP/504

- Provide visual aids and simplified instructions.
- Offer extra time for activities.
- Pair students with peer support as needed.

ELL

- Use visuals and gestures to support communication.
- Provide sentence frames to support discussions.
- Use simple language for explanations.
- Use simple language for explanations.

G&T

- Encourage students to explore other ways to connect, like satellite connections.
- Challenge them to explain the different kinds of security measures, like passwords, to other students.
- Allow students to create a role play that describes the connections, the security measures, and how we use the internet to share ideas.

List of Core Instructional and Supplemental Materials

●Pictures and videos of people using computers, tablets, and phones

●Globe or map

●Drawing materials

●Simple props for role-playing

Interdisciplinary Connections

●Social Studies: Connect to discussions about families and communities around the world.

●Language Arts: Practice verbal communication during discussions and explaining drawings.

Art: Express understanding through drawings and other visual representations.

Integration of 21st Century Skills and Life/Career Standards

●Communication and Collaboration: Students collaborate during discussions and activities.

●Information Literacy: Students learn how technology connects people to information.

●Social and Cross-Cultural Skills: Students begin to learn about connecting to others around the world.Integration of Technology Standards:

●Students will begin to understand the uses of digital devices in daily life.

●Students will start to explore ways that technology helps them connect with others.

Fourth Grade

- **Unit 1: Digital Storytelling, Research, and Online Responsibility**
    - Essential Questions:
        - What knowledge of technology and digital tools is required to appropriately and effectively use operations and related applications to solve problems?
        - How can using digital tools and media-rich resources enhance creativity and the construction of knowledge?
        - How can students use digital tools to assist them in gathering and managing information?
        - What societal concerns regarding the practice of safe, legal, and ethical behaviors do technological advancements create?
        - How can using digital tools and environments support the learning process and foster collaboration in solving local or global issues and problems?
    - Skills:
        - Type 14-20 words per minute using the correct keyboarding skills
        - Determine the benefits of a wide range of digital tools by using them to solve problems
        - Produce a media-rich digital story about significant local events, issues, or history based on first-person interviews
        - Evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks
        - Model appropriate online behaviors related to cyber safety, cyberbullying, cyber security, and cyber ethics
        - Engage in online discussions with learners in the United States or from other countries to understand their perspectives on global problems or issues

2020 NJSLS-CSDT Standards:

8.1.5.CS.1: Model how computing devices connect to other components to form a system[29].

8.1.5.CS.2: Model how computer software and hardware work together as a system to accomplish tasks[30].

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods30.

8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information36.

8.1.5.IC.1: Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes31. * **8.1.5.DA.1:** Collect, organize, and display data in order to highlight relationships or support a claim31.

8.2.5.ED.1: Explain the functions of a system and its subsystems43.

Lesson 1: Keyboarding Skills and Digital Tool Proficiency

Objective: Students will improve typing speed to 14-20 words per minute and explore the use of various digital tools.

Activity:

Incorporate daily typing practice using appropriate keyboarding techniques. Focus on accuracy and speed, aiming to reach 14-20 words per minute.

Introduce a variety of digital tools (e.g., graphic organizers, presentation software, video editing software).

Engage students in activities that require them to use different digital tools to complete specific tasks or solve problems.

Assessment: Evaluate typing speed and accuracy using online typing tests and assess their ability to use digital tools effectively.

Lesson 2: Digital Tools for Problem Solving and Creativity

Objective: Students will determine the benefits of using a wide range of digital tools to enhance creativity and the construction of knowledge for problem-solving.

Activity:

Present various problem-solving scenarios and have students explore a variety of digital tools that can be used to support the process (e.g., brainstorming tools, online simulation tools, and research databases).

Have students create digital media to express their solutions, encouraging creativity using tools such as digital drawing software, animation tools, and music composition applications.

Have students discuss the benefits of each tool in solving different types of problems.

Assessment: Observe students as they select and use tools for problem-solving and assess the creative use of digital tools in their projects and discussions.

Lesson 3: Digital Storytelling: Planning and Interviewing

Objective: Students will plan and conduct first-person interviews to gather information for a digital story.

Activity:

Introduce the concept of digital storytelling.

Guide students in developing interview questions for people who have experienced or been involved in a significant local event, issue, or history.

Have students practice conducting interviews and emphasize the importance of asking clarifying questions to gain a better understanding of the topic.

Assessment: Assess the appropriateness of student interview questions, and their ability to demonstrate effective interview techniques.

Lesson 4: Digital Storytelling: Creating Media-Rich Content

Objective: Students will produce a media-rich digital story based on the information from their interviews.

Activity:

Using various digital media tools such as presentation software, video editors, and audio recording software have students assemble media including video, images, audio recordings, and text to construct a compelling digital story.

Encourage students to incorporate background music, transition,s and titles.

Assessment: Evaluate the use of the digital storytelling process and the incorporation of multimedia elements to create an engaging narrative.

Lesson 5: Evaluating Information Sources

Objective: Students will evaluate the accuracy, relevance, and appropriateness of using print and non-print electronic information sources.

Activity:

Introduce the concept of evaluating information using a checklist that includes accuracy, relevance, and appropriateness.

Students will use their checklist to examine a variety of sources, including articles, websites, and videos related to their digital storytelling topic.

Have students discuss and identify the strengths and weaknesses of each source.

Assessment: Observe student discussions and the application of the evaluation checklist when researching.

Lesson 6: Online Responsibility: Cyber Safety, Cyberbullying, and Cyber Ethics

Objective: Students will model appropriate online behaviors related to cyber safety, cyberbullying, cybersecurity, and cyber ethics.

Activity:

Discuss different aspects of online responsibility, such as safe online communication, privacy settings, and respectful online behavior.

Have students create scenarios and role-play appropriate responses to situations involving cyberbullying, and unethical online behavior.

Discuss the importance of protecting personal information and passwords to be cyber secure.

Assessment: Observe students' role-playing activities and assess their comprehension of safe, ethical, and responsible online behaviors.

Lesson 7: Online Collaboration and Global Perspectives

Objective: Students will engage in online discussions with learners in the United States or from other countries to understand their perspectives on global problems or issues.

Activity:

Use online platforms to engage in discussions with learners from different locations.

Facilitate discussions on global issues, encouraging students to share their own perspectives and learn from others.

Encourage students to ask questions about the different perspectives.

Assessment: Assess student participation and contributions to online discussions, with a focus on their ability to listen to, understand, and respect different points of view.

- **Unit 2: Collaborative Design and Problem-Solving**
    - Essential Questions:
        - In what ways can digital tools facilitate local and global communication and collaboration when designing products and systems?
        - How can students use the design process to provide a means to convert resources into products and systems?
    - Skills:
        - Work in collaboration with peers to produce and publish a report that explains how technology is or was successfully or unsuccessfully used to address a local or global problem
        - Explain the functions of a system and subsystems
        - Evaluate the function, value, and aesthetics of a technological product, system, or environment from the perspective of the user and the producer

2020 NJSLS-CSDT Standards:

8.1.5.DA.2: Compare the amount of storage space required for different types of data.

8.1.5.AP.1: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).

8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.

8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of a product and a system.

8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.

Lesson 1: Introduction to Systems and Subsystems

Objective: Students will be able to **explain the functions of a system and its subsystems.**

Activity:

Introduce the concept of a "system" using everyday examples such as a bicycle or a school.

Have students identify the main parts (subsystems) of a given system and explain what each part does and how it contributes to the system as a whole.

Use diagrams or graphic organizers to show the relationships between the subsystems of a system.

Assessment: Evaluate students' explanations of system functions and subsystems through class discussion and diagrams that they create.

Lesson 2: Collaborative Problem Identification

Objective: Students will work together to **identify a local or global problem that technology could address.**

Activity:

Facilitate a class discussion on local and global problems (e.g., pollution, lack of access to clean water).

Guide students in using digital tools such as online brainstorming boards to share and evaluate different problems.

In small groups, students will choose a specific problem to investigate further.

Assessment: Evaluate student participation in online discussions and their contributions to selecting a problem to address.

Lesson 3: Technology and Problem-Solving Research

Objective: Students will use digital tools to research how technology has been used to address their chosen problem.

Activity:

Guide students to appropriate online databases and resources for research.

Have students collaborate to gather information on how technology has been successfully and/or unsuccessfully used to address their problem.

Students will document their findings using digital tools such as online note-taking or shared documents.

Assessment: Assess student research and the information collected, observing their use of online tools and resources.

Lesson 4: Collaborative Report Writing

Objective: Students will collaboratively **produce a report that explains how technology is or was used to address a local or global problem.**

Activity:

Students will work collaboratively to draft a report using word processors and shared online documents.

Students will organize the information gathered from their research into a clear and concise report, and make sure that each student in the group contributes to the report.

Students will cite the sources they used in their research and provide an explanation of their sources, as well as provide visual aids such as images or diagrams to support their report.

Assessment: Evaluate the clarity and organization of the student-produced reports and the successful collaboration demonstrated by each group.

Lesson 5: Evaluating Technological Products and Systems

Objective: Students will be able to **evaluate the function, value, and aesthetics of a technological product, system, or environment from the perspective of the user and the producer.**

Activity:

Introduce the concepts of function, value, and aesthetics in product design using examples (e.g., a park, a game, a tool).

Using a chosen product or system as an example, have students evaluate its function by describing its purpose, assess its value to the user by determining how it meets their needs, and describe its aesthetics by determining its visual appeal.

Guide students to consider the perspectives of both the user and the producer of a specific technological product.

Assessment: Assess student understanding of how to evaluate the function, value, and aesthetics of technological products, systems, or environments through class discussions and their written evaluations.

Lesson 6: Design Thinking Challenge

Objective: Students will use the design process to develop a prototype solution.

Activity:

Based on what they have learned, have each group of students consider how technology could improve the problem they have identified and researched.

Using the design process have the students collaborate on creating a plan and a design for a solution.

Have student groups create and present a digital model or a sketch of their proposed solution, using presentation software and digital drawing tools.

Assessment: Assess student understanding of the design process, and their ability to create a logical plan and a prototype.

Lesson 7: Publishing and Sharing

Objective: Students will prepare their final report for publication, and share their findings.

Activity:

Have students edit and refine their reports with a focus on accuracy, clarity, and organization.

Have students create a final publication and presentation of their findings using presentation software and online publishing platforms.

Students will present their findings to the class.

Assessment: Assess the final published reports, and evaluate student presentations to determine their understanding of the topic.

Integrated Accommodations and Modifications for Students with IEP/504/ELL and G&T:

IEP/504

- Provide visual aids and simplified instructions.
- Offer extra time for activities.
- Pair students with peer support as needed.

ELL

- Use visuals and gestures to support communication.
- Provide sentence frames to support discussions.
- Use simple language for explanations.
- Use simple language for explanations.

G&T

- Encourage students to explore other ways to connect, like satellite connections.
- Challenge them to explain the different kinds of security measures, like passwords, to other students.
- Allow students to create a role play that describes the connections, the security measures, and how we use the internet to share ideas.

List of Core Instructional and Supplemental Materials

●Pictures and videos of people using computers, tablets, and phones

●Globe or map

●Drawing materials

●Simple props for role-playing

Interdisciplinary Connections

●Social Studies: Connect to discussions about families and communities around the world.

●Language Arts: Practice verbal communication during discussions and explaining drawings.

Art: Express understanding through drawings and other visual representations.

Integration of 21st Century Skills and Life/Career Standards

●Communication and Collaboration: Students collaborate during discussions and activities.

●Information Literacy: Students learn how technology connects people to information.

●Social and Cross-Cultural Skills: Students begin to learn about connecting to others around the world.Integration of Technology Standards:

●Students will begin to understand the uses of digital devices in daily life.

●Students will start to explore ways that technology helps them connect with others.

Enduring Understandings

Knowledge & Skills

- **Computing Systems:**
    - Explore the interaction between hardware and software components of computing systems.
    - Learn troubleshooting strategies for common hardware and software problems.
    - Understand the impact of human-computer interaction on device design.
    - Analyze the trade-offs involved in designing and selecting computing systems.
- **Networks and the Internet:**
    - Investigate how computer networks connect individuals and devices.
    - Explore the role of the Internet in global communication.
    - Understand the importance of cybersecurity and authentication measures.
    - Learn about network protocols, packets, and addressing for reliable data transmission.
    - Analyze network security measures and their evolution in response to malware threats.
- **Impacts of Computing:**
    - Examine how computing technologies have changed the way individuals live and work.
    - Discuss the positive and negative impacts of technology on society.
    - Analyze the ethical considerations and potential biases in technology design and use.
    - Explore the economic, social, and cultural implications of advancements in computing.
- **Data & Analysis:**
    - Develop skills in collecting, organizing, and displaying data to highlight relationships and support claims.
    - Learn about different data formats, storage requirements, and the representation of data as bits.
    - Understand data visualization techniques and their use in communicating insights.
    - Explore data analysis tools and techniques for cleaning and transforming data.
    - Develop and refine computational models to simulate events and make predictions.
- **Algorithms & Programming:**
    - Gain a deeper understanding of algorithms and their role in solving problems.
    - Explore different types of algorithms and their suitability for various tasks.
    - Learn programming concepts like variables, control structures, and procedures.

    - Develop skills in designing, implementing, testing, and refining programs.
    - Explore modular programming and the use of existing code libraries.
    - Collaborate on complex programming projects.
- **Engineering Design:**
    - Understand the engineering design process and its iterative nature.
    - Learn to identify and address constraints and trade-offs in design decisions.
    - Develop skills in prototyping, testing, and refining designs.
    - Explore the use of engineering drawings and modeling tools.
    - Collaborate on design projects to address real-world problems.
- **Interaction of Technology and Humans:**
    - Analyze how societal needs and wants drive technological development.
    - Examine the impact of technology on various aspects of society, including economic, political, social, and cultural factors.
    - Explore the positive and negative consequences of technology adoption.
    - Discuss the role of ethics and sustainability in technology design and development.
- **Nature of Technology:**
    - Understand the process of innovation and improvement in technology.
    - Explore how technologies are adapted and repurposed for different functions.
    - Analyze the factors influencing technological advancement, including scientific discoveries and resource availability.
    - Discuss the challenges of technology redesign and optimization.
- **Effects of Technology on the Natural World:**
    - Examine the environmental impacts of technology, both positive and negative.
    - Explore ways to minimize the negative consequences of technology on the environment, including climate change.
    - Learn about sustainable technologies and practices.
    - Analyze the trade-offs between environmental and economic considerations in technology development.
- **Ethics & Culture:**
    - Discuss the ethical implications of technology use and development.
    - Explore issues related to technology access and equity.
    - Analyze the role of culture in shaping technological choices.
    - Examine the impact of technology on different groups of people.

Integration with Core Subject Areas

- **Language Arts:**
  - Digital storytelling
  - Research projects
  - Multimedia presentations
  - Coding creative writing projects
- **Math:**
  - Data analysis and graphing
  - Spreadsheet applications
  - Problem-solving with coding
  - Using algorithms to solve mathematical problems
- **Science:**
  - Research and data collection
  - Simulations and modeling
  - Climate change data analysis
  - Programming scientific simulations
- **Social Studies:**
  - Mapping and geographic information systems (GIS)
  - Virtual field trips
  - Research projects using digital archives
  - Analyzing historical trends using technology

Assessment:

- Ongoing formative assessments (observations, projects, quizzes)
- Summative assessments (unit tests, performance tasks)
- Student portfolios to track growth over time

Professional Development:

- Ongoing professional development for teachers to stay current with technology trends and best practices
- Collaboration with technology specialists and coaches
- Opportunities to attend conferences and workshops

Resources:

- Age-appropriate software and websites
- Computers, Chromebooks, and other devices with internet access
- Robotics kits (for applicable grade levels)
- Online subscriptions (as needed)
- Google Accounts and Google Apps for Education
- Typing to Learn 4

New Jersey Student Learning Standards (NJSLS):

This curriculum will be aligned with the New Jersey Student Learning Standards for Computer Science and Design Thinking (NJSLS-CS&DT) and other relevant NJSLS.

New Jersey Legislative Statutes and Administrative Codes:

The development and implementation of this curriculum will be guided by relevant New Jersey legislative statutes and administrative codes, including those related to 21st-century themes and skills, interdisciplinary connections, and the inclusion of diverse perspectives in the curriculum.

Elementary STEM & Science Curriculum Analysis and Unit Alignment

This document outlines the K-5 science units within the curriculum that will be aligned and built as STEM units of study for Mendham Township Elementary Schools.

After reviewing the current elementary science and STEM units and the middle school STEM program of study, we have identified our scope and sequence alignment recommendations. These units of study within the existing K-5 science curriculum will be used to develop strong STEM connections and structure a scope and sequence to strengthen students' learning experiences with authentic 21st century connections. With these recommendations, teachers and their students will better understand how their knowledge and skills in science and STEM are aligned and connected to the real world from year to year.

In the table below, there are two units identified from the current Science curriculum in Grades K-4 that can be further modified to align with the Mendham Middle School scope and sequence. The alignments are centered around the essential questions and standards each unit seeks to address, surfacing the learning connections in the content of each aligned unit. This presents an opportunity for deeper STEM foundations and scaffolded instruction in the Mendham Elementary STEM curriculum.

	1st Origin Unit	1st Aligned Sequential Unit	2nd Origin Unit	2nd Aligned Sequential Unit
Grade K	**Grade K Unit 1** **Plant & Animal Secrets** Alignment: *Essential Question* *"Where do plants and animals live and why do they live there?"* *NJSLS Standards:* *(K-ESS2-2)* *Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.* *(K-ESS3-1)* *Use a model to represent the*	**Grade 1 Unit 1** **Plant & Animal Superpowers** Alignment *Essential Question* *"How can humans mimic how plants and animals use their external parts to help them survive and grow?"* *NJSLS Standards:* *(1-LS3-1)* *Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar*	**Grade K Unit 4** **Weather Watching** Alignment *Essential Question* *"How can we use science to keep a playground cool in the summertime?* *NJSLS Standards:* *(K- PS3-1)* *Make observations to determine the effect of sunlight on Earth's surface.* *(K- PS3-2)* *Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface.**	**Grade 1 Unit 3** **Spinning Sky** Alignment Essential Question "*What patterns of change can be predicted when observing the sun*?" NJSLS Standards: (1-ESS1-1) Use observations of the sun, moon, and stars to describe patterns that can be predicted. (1-ESS1-2) Make observations at different times of year to relate the amount of

	relationship between the needs of different plants and animals (including humans) and the places they live. *(K-LS1-1)* *Use observations to describe patterns of what plants and animals (including humans) need to survive.*	*organisms.* *(1-LS1-1)* *Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.** *(1-LS1-2)* *Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.*		daylight to the time of year.
Grade 1	**Grade 1 Unit 1** **Plant & Animal Superpowers** Alignment *Essential Question* *"How can humans mimic how plants and animals use their external parts to help them survive and grow?"* *NJSLS Standards:* *(1-LS3-1)* *Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.* *(1-LS1-1)* *Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.** *(1-LS1-2)* *Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.*	**Grade 2 Unit 3** **Animal Adventures** Alignment *Essential Question* *"What do plants need to live and grow?"* *NJSLS Standards:* *(2-LS4-1)* *Make observations of plants and animals to compare the diversity of life in different habitats.* *(2-LS2-1)* *Plan and conduct an investigation to determine if plants need sunlight and water to grow.* *(2-LS2-2)* *Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.**	**Grade 1 Unit 3** **Spinning Sky** Alignment *Essential Question* "*What patterns of change can be predicted when observing the sun*? NJSLS Standards: (1-ESS1-1) Use observations of the sun, moon, and stars to describe patterns that can be predicted. (1-ESS1-2) Make observations at different times of year to relate the amount of daylight to the time of year.	**Grade 2 Unit 2** **Work of Water** *Alignment* *Essential Question* *"What evidence can we find to prove that Earth events can occur quickly or slowly?"* *NJSLS Standards:* *(2-ESS1-1)* *Use information from several sources to provide evidence that Earth events can occur quickly or slowly.* *(2-ESS2-2)* *Develop a model to represent the shapes and kinds of land and bodies of water in an area.* *(2-ESS2-3)* *Obtain information to identify where water is found on Earth and that it can be solid or liquid.*

Grade 2	**Grade 2 Unit 3** **Animal Adventures** Alignment *Essential Question* *"Why do some plants rely on animals for reproduction?* *NJSLS Standards:* *(2-LS4-1)* *Make observations of plants and animals to compare the diversity of life in different habitats.* *(2-LS2-1)* *Plan and conduct an investigation to determine if plants need sunlight and water to grow.* *(2-LS2-2)* *Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*	**Grade 3 Unit 6** **Organisms and the Environment** Alignment *Essential Question* *"How does genetic variation among organisms affect survival and reproduction?"* *NJSLS Standards:* *(3-LS2-1)* *Construct an argument that some animals form groups that help members survive.* *(3-LS4-3)* *Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.*	**Grade 2 Unit 4** **Plant Adventures** Alignment *NJSLS Standard* *"Make observations of plants and animals to compare the diversity of life in different habitats." (2-LS4-1)* *NJSLS Standards:* *(2-LS4-1)* *Make observations of plants and animals to compare the diversity of life in different habitats.* *(2-LS2-1)* *Plan and conduct an investigation to determine if plants need sunlight and water to grow.* *(2-LS2-2)* *Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*	**Grade 3 Unit 5** **Weather and Climate** Alignment *NJSLS Standard* *"Obtain and combine information to describe climates in different regions of the world." (3-ESS2-2)* *NJSLS Standards:* *(3-ESS2-1)* *Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.* *(3-ESS2-2)* *Obtain and combine information to describe climates in different regions of the world.* *(3-ESS3-1)* *Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*
Grade 3	**Grade 3 Unit 7** **Using Evidence to Understand Change in the Environment** Alignment *Essential Question* *"What do fossils tell us about the organisms and the environments in which they lived?"* *NJSLS Standards:* *(3-LS4-1)* *Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.* *(3-LS4-4)* *Make a claim about the merit of a*	**Grade 4 Unit 3** **Birth of Rocks - Rock Cycle, Erosion, and Natural Hazards** Alignment *Essential Question* *"What can rock formations tell us about the past?"* *NJSLS Standards:* *(4-ESS2-1)* *Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or*	**Grade 3 Unit 3** **Forces and Motion** Alignment *Essential Question* *"How do equal and unequal forces exerted on an object affect the object?"* *NJSLS Standards:* *(3-PS2-1)* *Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.* *(3-PS2-2)*	**Grade 4 Unit 4** **Waves of Sound ~ Sound, Waves, & Communication** Alignment *Essential Question* *"Similarities and differences in patterns can be used to sort and classify natural phenomena."* *NJSLS Standards:* *(4-PS4-1)* *Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.* *(4-PS4-3)* *Generate and compare multiple*

	solution to a problem caused when the environment changes and the types of plants and animals that live there may change. *(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.*	*vegetation.* *(4-ESS1-1)* *Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.* *(4-ESS2-2)* *Analyze and interpret data from maps to describe patterns of Earth's features.* *(4-ESS3-2)* *Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*	*Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.*	*solutions that use patterns to transfer information.*
Grade 4	**Grade 4 Unit 1** **Human Machine - Body, Senses, and the Brain** Alignment *Essential Question* *"How do internal and external parts of plants and animals help them to survive, grow, behave, and reproduce?"* *NJSLS Standards:* *(4-LS1-1)* *Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.* *(4-LS1-2)* *Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.* *(4-PS4-2)* *Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.*	**Grade 5 Unit 2** **Engineering with Coding and Robotics** Alignment *Essential Question* *"How can coding and robotics help us do things more efficiently or effectively or enable us to do things we wouldn't have been able to do without them?"* *NJSLS Standards:* *(5.ESS3.1)* *Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources, and environment, and address climate change issues.*	**Grade 4 Unit 2** **Energizing Everything - Energy & Motion** Alignment *Essential Question* *"From what natural resources are energy and fuels derived? In what ways does the human use of natural resources affect the environment?"* *NJSLS Standards:* *(4-PS3-1)* *Use evidence to construct an explanation relating the speed of an object to , the energy of that object.* *(4-PS3-2)* *Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.* *(4-PS3-3)* *Ask questions and predict outcomes about the changes in energy that occur when objects collide.* *(4-PS3-4)* *Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	**Grade 5 Unit 1** **Empathetic Engineering** Alignment *Essential Question* *"How do engineers design innovative solutions that consider the needs of individuals and society such as sustainability, employment, and inclusivity?"* *NJSLS Standards:* *(3-5.ETS1.1)* *Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.* *(3-5.ETS1.2)* *Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.* *(3-5.ETS1.3)* *Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.*

K-4 Computer Science and Design Thinking Curriculum Pacing Chart

Kindergarten

Grade	Marking Period	Number of Weeks	Month
K	Unit 1 MP1 & 2	*10-20*	*Sept.-Dec.*
K	Unit 2 MP2 & 3	*10-20*	*Dec.-Feb.*
K	Unit 3 MP3 & 4	*10-20*	*March-June*

First Grade

Grade	Marking Period	Number of Weeks	Months
1	Unit 1 MP1 & 2	*10-20*	*Sept.-Dec.*
1	Unit 2 MP2 & 3	*10-20*	*Dec.-Feb.*
1	Unit 3 MP3 & 4	*10-20*	*March-June*

Second Grade

Grade	Marking Period	Number of Weeks	Months
2	Unit 1 MP1 & 2	*10-20*	*Sept.-Dec.*
2	Unit 2 MP2 & 3	*10-20*	*Dec.-Feb.*
2	Unit 3 MP3 & 4	*10-20*	*March-June*

Third Grade

Grade	Marking Period	Number of Weeks	Months
3	Unit 1 MP1 & 2	*10-20*	*Sept.-Dec.*
3	Unit 2 MP2 & 3	*10-20*	*Dec.-Feb.*
3	Unit 3 MP3 & 4	*10-20*	*March-June*

Fourth Grade

Grade	Marking Period	Number of Weeks	Months
4	Unit 1 MP1& 2	10-20	*Sept.-Jan.*
4	Unit 2 MP 3&4	10-20	*Feb.- June*