Technology Enrichment - Grade K

Unit Title: Grade K - Unit 1 -- Introduction to Technology and Digital Citizenship

Stage 1: Desired Results

Standards & Indicators:

NJSLS Mathematics

- MP 1 Make sense of problems and persevere in solving them.
- MP 2 Reason abstractly and quantitatively.
- MP 6 Attend to precision.
- K.OA.A.1 Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using
- objects or drawings to represent the problem.
- K.OA.A 3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using
- objects or drawings, and record each decomposition by a drawing or equation
- K.M.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
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.	Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.	A computing system is composed of software and hardware.
8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.	Describing a problem is the first step toward finding a solution when computing systems do not work as expected.
8.1.2.NI.1	Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.	Computer networks can be used to connect individuals to other individuals, places, information, and ideas. The Internet enables individuals to connect with others worldwide.
8.1.2.NI.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.	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access.
8.1.2.NI.4	Explain why access to devices need to be secured.	
8.1.2.IC.1	Compare how individuals live and work before and after the implementation of new computing technology.	Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).
8.1.2.DA.2	Store, copy, search, retrieve, modify, and delete data using a computing device.	Computers store data that can be retrieved later. Data can be copied,

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		stored in multiple locations, and retrieved.
8.2.2.ITH.1	Identify products that are designed to meet human wants or needs.	Human needs and desires determine which new tools are developed.
8.2.2.ITH.2	Explain the purpose of a product and its value.	
8.2.2.ITH.3	Identify how technology impacts or improves life.	Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.
8.2.2.ITH.4	Identify how various tools reduce work and improve daily tasks.	
8.2.2.ITH.5	Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.	
8.2.2.EC.1	Identify and compare technology used in different schools, communities, regions, and parts of the world.	The availability of technology for essential tasks varies in different parts of the world.
Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.2.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.
9.4.2.DC.2	Explain the importance of respecting digital content of others.	Digital artifacts can be owned by individuals or organizations.
9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet	Individuals should practice safe behaviors when using the Internet.
9.4.2.DC.4	Compare information that should be kept private to information that might be made public.	
9.4.2.DC.5	Explain what a digital footprint is and how it is created.	An individual's digital footprint reflects the various actions an individual makes online, both positive and negative.
9.4.2.DC.6	Identify respectful and responsible ways to communicate in digital environments.	Digital communities allow for social interactions that can result in positive or negative outcomes.

Central Idea / Enduring Understanding:

Students will…

- Understand how tools make work easier and how computers are tools that help us.
- Identify parts of the computer by name and describe what they do.
- Identify parts of an iPad.
- Distinguish safe and unsafe behaviors when using a device.
- Identify the letters, numbers, and "power keys" (enter/return, shift, space, backspace/delete) on a keyboard and understand what they do.
- Understand what the Internet is and what it can do
- Understand how to stay safe online and compare how it is similar to staying safe in the real world
- Define rules for traveling safely on the Internet.

Essential/Guiding Question:

- How is a computer a tool?
- What are the parts of a computer, what do they do, and what are safe and unsafe behaviors when using a device?
- Where are the letters, numbers, and "power keys" (enter/return, shift, space, backspace/delete) on a keyboard and what do they do?
- How do you go places safely on the computer?
- What kinds of information should you keep to yourself when you use the Internet?
- How can you give credit to your own creative work and others' creative work?
- What does it mean to be a good digital citizen and have proper digital etiquette when communicating?

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● Recognize the kind of information that is personal and understand the importance and safety of keeping personal information, usernames, and passwords private. ● Understand why giving proper credit is important. ● Understand that the Internet provides a means of communicating with real people ● Understand what it means to be a good digital citizen and how to have proper digital etiquette when communicating.	
Content: ● Tools ● Parts of a computer ● iPad ● Computer terminology ● Keyboard ● Internet ● Internet safety ● Personal information ● Usernames and passwords ● Ownership ● Communication ● Digital citizenship	**Skills (Objectives):** ● Explain how tools help make work easier and how computers are tools that can help us in different ways. ● Identify and explain what each part of the computer does, open and close programs on an iPad, use a touch-screen properly and effectively, and explain and practice safe and unsafe behaviors when using a device. ● Recognize, locate, and use the letters, numbers, and “power keys” (enter/return, shift, space, backspace/delete) appropriately and effectively. ● Discover that the Internet can be used to learn new things, compare how staying safe online is similar to staying safe in the real world, and explain rules for traveling safely on the Internet. ● Recognize the kind of information that is personal, understand that they should never give out personal information on the Internet, create effective usernames and passwords that protect their personal information, and understand the importance and safety of keeping usernames and passwords private. ● List some reasons why giving credit is important. ● Understand that the Internet provides a means of communicating with real people and how to be a good digital citizen when communicating.
Interdisciplinary Connection(s): **NJSLS for Language Arts Literacy** ● L.RF.K.1. Demonstrate understanding of the organization and basic features of print. ● L.RF.K.2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes). ● L.RF.K.3. Know and apply grade-level phonics and word analysis skills in decoding and encoding words. ● L.WF.K.1 Demonstrate command of the conventions of writing. ● L.WF.K.2 Demonstrate command of the conventions of encoding and spelling common, regular, single-syllable words. ● L.WF.K.3 Demonstrate command of the conventions of sentence composition. ● L.KL.K.1. With prompting and support, develop knowledge of language and its conventions when speaking and listening. ● L.VL.K.2. With prompting and support, ask and answer questions to help determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.	

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- L.VI.K.3. With guidance and support from adults, explore word relationships and nuances in word meanings.
- RL.CR.K.1 With prompting and support, ask and answer questions about key details in a literary text (e.g., who, what, where, when, why, how).
- RI.CR.K.1 With prompting and support, ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how). other media by asking and answering questions about key details and requesting clarification if something is not understood.
- W.AW.K.1. Use a combination of drawing, dictating, and writing to compose opinion pieces on topics or texts (e.g., My favorite book is...).SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.
- W.NW.K.3. Use a combination of drawing, dictating, and writing to narrate real or imagined experiences or events.
- W.RW.K.7. With prompting and support, engage in brief but regular writing and drawing tasks.
- SL.AS.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

NJSLS for Social Studies

- 6.1.5.EconNM.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.
- 6.1.5.EconGE.1: Explain how the development of communication systems has led to increased collaboration and the spread of ideas throughout the United States and the world.
- 6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.

Stage 2: Assessment Evidence

Performance Task(s):

- Student classwork/projects
- Student demonstration
- Class/partner/group discussion
- Self-assessments
- Peer-assessments
- Turn and Talk
- Various class activities and games
- Self-reflection
- Exit tickets/questions
- Going Places Safely Assessment [PDF]
- Keep It Private Assessment [PDF]
- My Creative Work Assessment [PDF]
- Sending Email Assessment [PDF]

Other Evidence:

- Teacher observation
- Student/Teacher conference
- Unit Assessments [Web][PDF]

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Lesson 1: Everyone uses tools

Students will learn why people use different tools to help with different jobs. They will understand how tools help make work easier. Students will discover how computers can be found in all kinds of things all around us and will discuss examples (such as a washing machine, etc.). They will learn how computers can help us in many different ways.

Lesson 2: Parts of the computer/iPad and using them properly

Resources:

Lesson 1: Everyone uses tools

- How does technology integrate into usable tools in various industries https://www.youtube.com/watch?v=UMLTCUwzH0A
- How do robots work
- How do computers work
- Technology all around us

Lesson 2: Parts of the computer/iPad and using them properly

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Students will learn about the parts of the computer and learn what they do. They will learn about the parts of the iPad. They will learn how to open and close programs on an iPad. They will learn how to use a touch-screen properly and effectively. Students will learn what it means to have safe and unsafe behaviors when using a device.	• Parts of the Computer video (https://www.youtube.com/watch?v=difvQyWFmxw)
Lesson 3: Using the keyboard Students will learn how the keyboard is used to input information. They will identify and locate the letters and numbers. They will learn about "power keys" (enter/return, shift, space bar, backspace/delete) and how to use them. They will practice using the keyboard effectively to input information.	Lesson 3: Using the keyboard • Notes app
Lesson 4: Going places safely Students learn that they can go to exciting places online, but they need to follow certain rules to remain safe. By taking a virtual field trip, students experience the power of the Internet to take them to places they might not be able to visit in person. They learn that they should follow safety rules when they travel online, just as when traveling in the real world.	Lesson 4: Going places safely • Lesson-Internet Safety • internet safety video:https://jr.brainpop.com/artsandtechnology/technology/internetsafety/
Lesson 5: Keep it private Students learn that many websites ask for information that is private and discuss how to responsibly handle such requests. Students review what information is private and should not be shared without a trusted adult's permission. They view an online form that asks for private information and understand that they should never share this kind of information online. Students then view sites that ask them to create usernames, and they learn rules for safeguarding their private information when they create usernames.	Lesson 5: Keep it private • Lesson-Internet Safety • Keeping your information private Online Privacy for Kids - Internet Safety and … • Internet privacy information Internet Safety Tips for Kids
Lesson 6: My creative work Students learn the basics – title, name, and date – for crediting creative work. Students discuss the importance of citing work, as well as recognizing that they should give themselves proper credit so that others can attribute their work when used.	Lesson 6: My creative work • Lesson-Internet Safety
Lesson 7: Sending email Students explore how they can use email to communicate with real people within their schools, families, and communities. After discussing the different ways they can send messages to other people, students	Lesson 7: Sending email • Lesson-Internet Safety • Who to send emails to: • Sending Email: a K-2 Digital Citizenship Lesson

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observe an email exchange between teachers on paper. Students then participate in an imaginative role-play that helps them envision how messages are transmitted between people over the Internet.	

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Adaptation of materials and requirements Elevated text or question complexity Independent student options Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	**Materials** Provide pictures Provide text in alternative formats, such as large print, audio formats, or digital text Use peer readers Permit highlighting of text List discussion questions prior to reading text Vocabulary lists and/or study guides Provide lecture notes/outline Provide model or example **Environment** Reduce visual or auditory distractions Preferential seating Post a visual schedule Emphasize multi-sensory learning **Directions** Use oral, recorded, and/or printed directions with pictures	**Materials** Decreased text or question complexity Provide page numbers or highlighted texts Shorten assignments to focus on key concepts **Grading** Provide partial grade based on individual progress or effort Use recognition tests (true-false, multiple choice, or matching) instead of short answer Provide a vocabulary list with definitions Modified rubrics

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		Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions **Time** Alert students before transitions Provide additional time for tasks Extra response time	

Unit Title: Grade K - Unit 2 -- Navigation and Applications

Stage 1: Desired Results

Standards & Indicators:

NJSLS for Mathematics

- MP 1 Make sense of problems and persevere in solving them.
- MP 2 Reason abstractly and quantitatively.
- MP 6 Attend to precision.
- K.OA.A.1 Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using
- objects or drawings to represent the problem.
- K.OA.A 3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using
- objects or drawings, and record each decomposition by a drawing or equation
- K.M.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
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.	Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.	A computing system is composed of software and hardware.
8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.	Describing a problem is the first step toward finding a solution

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		when computing systems do not work as expected.
8.1.2.NI.4	Explain why access to devices need to be secured.	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access.
8.1.2.IC.1	Compare how individuals live and work before and after the implementation of new computing technology.	Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).
8.1.2.DA.2	Store, copy, search, retrieve, modify, and delete data using a computing device.	Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.4.2.CI.2	Demonstrate originality and inventiveness in work.	Brainstorming can create new, innovative ideas.
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.
9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool.	Digital tools have a purpose.
9.4.2.TL.2	Create a document using a word processing application.	
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools.	

Central Idea / Enduring Understanding:

Students will…

- Identify apps used to go on the Internet (Safari, Google Chrome).
- Navigate an Internet window (back button, new tab, close tabs, etc.).
- Type a website address into the address bar.
- Learn the characteristics of a hyperlink.
- Recognize and click hyperlinks to navigate to websites
- Locate activity screen vs. ads
- Locate important information on a website
- Use the scroll bar.
- Create a new document and type their name into a word processor.
- Type sight words into a word processor.

Essential/Guiding Question:

- How do you navigate an Internet window?
- How do you get to a website?
- What is a hyperlink?
- How do you navigate the internet using hyperlinks?
- How do you create a Doc and type in a Doc?
- How do you take a test on a device?
- How can you use the alphabet/keyboard to find things online?

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• Learn test taking strategies and complete practice tests on an iPad. • Learn how to search online by using the alphabet/keyboard.	
Content: • Internet • Internet browser • Address bar • Hyperlink • Internet navigation • Google Docs • Search bar	**Skills (Objectives):** • Identify Internet browser apps (Safari, Google Chrome) and how to navigate an Internet window (back button, new tab, close tabs, etc.). • Type a website address into the address bar. • Describe the characteristics of a hyperlink. • Recognize and click hyperlinks to navigate to websites, locate activity screen vs. ads, and important information, and use the scroll bar. • Create a new document and type their name into a word processor. • Type sight words into a word processor. • Use test taking strategies to complete practice tests on an iPad. • Search online by using the alphabet/keyboard.

Interdisciplinary Connection(s):

NJSLS for Language Arts Literacy

- L.RF.K.1. Demonstrate understanding of the organization and basic features of print.
- L.RF.K.2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
- L.RF.K.3. Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
- L.WF.K.1 Demonstrate command of the conventions of writing.
- L.WF.K.2 Demonstrate command of the conventions of encoding and spelling common, regular, single-syllable words.
- L.WF.K.3 Demonstrate command of the conventions of sentence composition.
- L.KL.K.1. With prompting and support, develop knowledge of language and its conventions when speaking and listening.
- L.VL.K.2. With prompting and support, ask and answer questions to help determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.
- L.VI.K.3. With guidance and support from adults, explore word relationships and nuances in word meanings.
- RL.CR.K.1 With prompting and support, ask and answer questions about key details in a literary text (e.g., who, what, where, when, why, how).
- RI.CR.K.1 With prompting and support, ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how). other media by asking and answering questions about key details and requesting clarification if something is not understood.
- W.AW.K.1. Use a combination of drawing, dictating, and writing to compose opinion pieces on topics or texts (e.g., My favorite book is...).SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.
- W.NW.K.3. Use a combination of drawing, dictating, and writing to narrate real or imagined experiences or events.
- W.RW.K.7. With prompting and support, engage in brief but regular writing and drawing tasks.
- SL.AS.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

NJSLS for Science

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

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

NJSLS for Social Studies

- 6.1.5.EconNM.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.
- 6.1.5.EconGE.1: Explain how the development of communication systems has led to increased collaboration and the spread of ideas throughout the United States and the world.
- 6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.

Stage 2: Assessment Evidence

Performance Task(s):

- Student classwork/projects
- Student demonstration
- Class/partner/group discussion
- Self-assessments
- Peer-assessments
- Turn and Talk
- Various class activities and games
- Self-reflection
- Exit tickets/questions
- A-B-C Searching Assessment [PDF]

Other Evidence:

- Teacher observation
- Student/Teacher conference

Stage 3: Learning Plan

Learning Opportunities/Strategies:	Resources:
Lesson 1: Navigating the Internet window Students will learn to identify which apps are used to go on the Internet. They will learn the main tools used to navigate an Internet window (back button, new tab, etc.) and how to close all open tabs.	Lesson 1: Navigating the Internet window • Safari app • Navigating various components of a website: Technology II - Vocabulary for Kids - Internet…
Lesson 2: Typing a website address They will learn how to type a website address into the address bar and hit “enter/return” to make it go to the website.	Lesson 2: Typing a website address • Safari app
Lesson 3: Characteristics of a hyperlink Students will learn the characteristics of a hyperlink. They will learn to look for blue words and underlined words.	Lesson 3: Characteristics of a hyperlink • Safari app • https://pbskids.org/ (students access both ways) • What is a hyperlink? ○ What is a hyperlink example?
Lesson 4: Navigating websites using hyperlinks Students will learn how to click hyperlinks to navigate to websites. To go back to a previous page, students will locate and use the “back button.” Students will locate “play” or “start” buttons, activity screen vs. ads, and important information. They will locate and use the scroll bar to navigate up and down on the website.	Lesson 4: Navigating websites using hyperlinks • Safari app

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Lesson 5: Creating a Doc Students will learn how to create a new document and type their name into a word processor. They will look for the cursor, or the "blinking line," that shows where the words appear or disappear (by using backspace).	Lesson 5: Creating a Doc • Google Docs
Lesson 6: Typing words in a Doc Students will learn to type sight word list into a doc.	Lesson 6: Typing words in a Doc • Google Docs • Why Aren't Keyboards in 'ABC' Order? | CO…
Lesson 7: Test taking strategies Students will learn the strategies needed to take a test using an iPad. They will learn how to login to a practice test and how to navigate through questions and testing windows. Students will also learn test taking strategies. They will learn to look for radio buttons ("circle answer choices"), multiple answer boxes ("square answer choices"), short answer text box, etc. to determine how to answer the question.	Lesson 7: Test taking strategies • Map testing app • MAP explanation video
Lesson 8: A-B-C searching Students search for pictures online by clicking on letters of the alphabet. They learn that directory sites with alphabetical listings offer one way to find things on the Internet. After observing a search as a class, students are assigned letters of the alphabet and perform their own searches on a children's directory site.	Lesson 8: A-B-C searching • Safari app • Kiddle.co

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Adaptation of materials and requirements Elevated text or question complexity Independent student options Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	**Materials** Provide pictures Provide text in alternative formats, such as large print, audio formats, or digital text Use peer readers Permit highlighting of text List discussion questions prior to reading text Vocabulary lists and/or study guides Provide lecture notes/outline Provide model or example	**Materials** Decreased text or question complexity Provide page numbers or highlighted texts Shorten assignments to focus on key concepts **Grading** Provide partial grade based on individual progress or effort Use recognition tests (true-false, multiple choice, or matching) instead of short answer Provide a vocabulary list with definitions

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		Environment Reduce visual or auditory distractions Preferential seating Post a visual schedule Emphasize multi-sensory learning **Directions** Use oral, recorded, and/or printed directions with pictures Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions **Time** Alert students before transitions Provide additional time for tasks Extra response time	Modified rubrics

Unit Title: Grade K -- Unit 3 -- Coding

Stage 1: Desired Results

Standards & Indicators:

NJSLS for Mathematics

- MP 1 Make sense of problems and persevere in solving them.
- MP 2 Reason abstractly and quantitatively.
- MP 6 Attend to precision.
- K.OA.A.1 Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using
- objects or drawings to represent the problem.
- K.OA.A 3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using
- objects or drawings, and record each decomposition by a drawing or equation

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● K.M.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.		
Computer Science and Design Thinking		
Standard	**Performance Expectations**	**Core Ideas**
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.	Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.	A computing system is composed of software and hardware.
8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.	Describing a problem is the first step toward finding a solution when computing systems do not work as expected.
8.1.2.NI.4	Explain why access to devices need to be secured.	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access.
8.1.2.IC.1	Compare how individuals live and work before and after the implementation of new computing technology.	Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).
8.1.2.AP.1	Model daily processes by creating and following algorithms to complete tasks.	Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process.
8.1.2.AP.2	Model the way programs store and manipulate data by using numbers or other symbols to represent information.	Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images).
8.1.2.AP.3	Create programs with sequences and simple loops to accomplish tasks.	Computers follow precise sequences of steps that automate tasks.
8.1.2.AP.4	Break down a task into a sequence of steps.	Complex tasks can be broken down into simpler instructions, some of which can be broken down even further.
8.1.2.AP.5	Describe a program's sequence of events, goals, and expected outcomes.	People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of
8.1.2.AP.6	Debug errors in an algorithm or program that includes sequences and simple loops.	

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		events, goals, and expected outcomes, and addressing errors (when necessary).

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.2.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives.	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work.	
9.4.2.CT.2	Identify possible approaches and resources to execute a plan.	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool.	Digital tools have a purpose.
9.4.2.TL.4	Navigate a virtual space to build context and describe the visual content.	
9.4.2.TL.7	Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.	Collaboration can simplify the work an individual has to do and sometimes produce a better product.

Central Idea / Enduring Understanding:

Students will…

- Understand that computers are machines that follow instructions called “code.”
- Use code to control the movement of something.

Essential/Guiding Question:

- What computer programming?
- How do you use code to control the movement of something?

Content:

- Computer programmer
- Computer program
- Code
- Command
- Algorithm
- Sequence
- Debug

Skills (Objectives):

- Understand what computer programming is and recognize that computers are machines that follow instructions called “code.”
- Understand how to use commands, such as move forward, backward, and turn to control the movement of something.
- Code a robot mouse with multiple step directions.
- Give directions to their peers (to act as robots) to stack cups in a certain way.
- Code a virtual character.
- Code a virtual character using multiple commands.

Interdisciplinary Connection(s):

NJSLS for Language Arts Literacy

- L.RF.K.1. Demonstrate understanding of the organization and basic features of print.
- L.RF.K.2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
- L.RF.K.3. Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
- L.WF.K.1 Demonstrate command of the conventions of writing.
- L.WF.K.2 Demonstrate command of the conventions of encoding and spelling common, regular, single-syllable words.
- L.WF.K.3 Demonstrate command of the conventions of sentence composition.

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- L.KL.K.1. With prompting and support, develop knowledge of language and its conventions when speaking and listening.
- L.VL.K.2. With prompting and support, ask and answer questions to help determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.
- L.VI.K.3. With guidance and support from adults, explore word relationships and nuances in word meanings.
- RL.CR.K.1 With prompting and support, ask and answer questions about key details in a literary text (e.g., who, what, where, when, why, how).
- RI.CR.K.1 With prompting and support, ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how). other media by asking and answering questions about key details and requesting clarification if something is not understood.
- W.AW.K.1. Use a combination of drawing, dictating, and writing to compose opinion pieces on topics or texts (e.g., My favorite book is...).SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
- W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.
- W.NW.K.3. Use a combination of drawing, dictating, and writing to narrate real or imagined experiences or events.
- W.RW.K.7. With prompting and support, engage in brief but regular writing and drawing tasks.
- SL.AS.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

NJSLS for Science

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

NJSLS for Social Studies

- 6.1.5.EconNM.4: Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.
- 6.1.5.EconGE.1: Explain how the development of communication systems has led to increased collaboration and the spread of ideas throughout the United States and the world.
- 6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.

Stage 2: Assessment Evidence

Performance Task(s):

- Student classwork/projects
- Student demonstration
- Class/partner/group discussion
- Self-assessments
- Peer-assessments
- Turn and Talk
- Various class activities and games
- Self-reflection
- Exit tickets/questions

Other Evidence:

- Teacher observation
- Student/Teacher conference

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Resources:

Technology Enrichment - Grade K

Lesson 1: What is computer programming? Students will learn what is computer programming and what is a command. They will learn that computers are machines that follow instructions called “code.” Students will learn to program the robot mouse to follow a set of instructions, just like a computer follows instructions given by a computer programmer. They will use strategies in critical thinking, problem solving, creativity, communication, and collaboration to complete programming challenges.	Lesson 1: What is computer programming? ● Robot Mouse kit
Lesson 2: Coding a robot mouse Students will learn to program the robot mouse to follow a set of instructions, just like a computer follows instructions given by a computer programmer. They will use the directional arrows to tell the robot mouse where to go, such as forward, backward, left, and right. They will use complete programming challenges using the robot mouse by changing the tiles and mouse/cheese placement on the grid.	Lesson 2: Coding a robot mouse ● Robot Mouse kit
Lesson 3: Coding a robot mouse with multiple step directions Students will program the robot mouse to follow multiple step directions.	Lesson 3: Coding a robot mouse with multiple step directions ● Robot Mouse kit
Lesson 4: My robotic friends Students will give directions to their peers (to act as robots) to stack cups in a certain way.	Lesson 4: My robotic friends ● plastic cups
Lesson 5: Coding a virtual character Students will learn the basics of computer programming through the Hour of Code - Pre-Reader Express Course. They will learn how to apply some basic computer commands, such as move forward turn, to control the movement of their character. Students will use strategies in critical thinking, problem solving, and debugging to complete coding puzzles.	Lesson 5: Coding a virtual character ● www.code.org
Lesson 6: Coding a virtual character using a few commands Students will continue working through the Hour of Code - Pre-Reader Express Course. They will learn how to apply some basic computer commands, such as move forward turn, to control the movement of their character. Students will use strategies in critical thinking, problem solving, and debugging to complete coding puzzles.	Lesson 6: Coding a virtual character using a few commands ● www.code.org
Lesson 7: Coding a virtual character using multiple commands Students will work through the Hour of Code - Course A by coding different characters with advanced difficulty	Lesson 7: Coding a virtual character using multiple commands ● www.code.org

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level. They will use strategies in critical thinking, problem solving, and debugging to complete coding puzzles.	

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Adaptation of materials and requirements Elevated text or question complexity Independent student options Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	**Materials** Provide pictures Provide text in alternative formats, such as large print, audio formats, or digital text Use peer readers Permit highlighting of text List discussion questions prior to reading text Vocabulary lists and/or study guides Provide lecture notes/outline Provide model or example **Environment** Reduce visual or auditory distractions Preferential seating Post a visual schedule Emphasize multi-sensory learning **Directions** Use oral, recorded, and/or printed directions with pictures	**Materials** Decreased text or question complexity Provide page numbers or highlighted texts Shorten assignments to focus on key concepts **Grading** Provide partial grade based on individual progress or effort Use recognition tests (true-false, multiple choice, or matching) instead of short answer Provide a vocabulary list with definitions Modified rubrics

Technology Enrichment - Grade K

		Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions **Time** Alert students before transitions Provide additional time for tasks Extra response time	

Unit Title: Grade K -- Unit 4 -- STEAM

Stage 1: Desired Results

Standards & Indicators:

NJSLS for Mathematics

- MP 1 Make sense of problems and persevere in solving them.
- MP 2 Reason abstractly and quantitatively.
- MP 6 Attend to precision.
- K.OA.A.1 Represent addition and subtraction up to 10 with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using
- objects or drawings to represent the problem.
- K.OA.A 3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using
- objects or drawings, and record each decomposition by a drawing or equation
- K.M.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- K.M.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.
- K.M.B.3-Understand that certain objects are coin and dollar bills and that coins and dollar bills represent money. Identify the values of all U.S. coIns and the one dollar bill.
- K.G.A.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
- K.G.A.2 Correctly name shapes regardless of their orientations or overall size.
- K.G.A.3 Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).
- K.G.B.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).
- K.G.B.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

Technology Enrichment - Grade K

• K.G.B.6 Compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?”		
Computer Science and Design Thinking		
Standard	**Performance Expectations**	**Core Ideas**
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.	Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.	A computing system is composed of software and hardware.
8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.	Describing a problem is the first step toward finding a solution when computing systems do not work as expected.
8.1.2.NI.4	Explain why access to devices need to be secured.	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access.
8.1.2.IC.1	Compare how individuals live and work before and after the implementation of new computing technology.	Computing technology has positively and negatively changed the way individuals live and work (e.g., entertainment, communication, productivity tools).
8.2.2.ED.1	Communicate the function of a product or device.	Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.
8.2.2.ED.2	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.	
8.2.2.ED.3	Select and use appropriate tools and materials to build a product using the design process.	
8.2.2.ED.4	Identify constraints and their role in the engineering design process.	Limitations (constraints) must be considered when engineering designs.
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.	Innovation and the improvement of existing technology involves creative thinking.
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.	
Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.2.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.

Technology Enrichment - Grade K

9.4.2.CI.1	Demonstrate openness to new ideas and perspectives.	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work.	
9.4.2.CT.2	Identify possible approaches and resources to execute a plan.	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools.	Digital tools have a purpose.
9.4.2.TL.7	Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.	Collaboration can simplify the work an individual has to do and sometimes produce a better product.

Content:

- Architecture
- Engineering
- Design
- Physical science
- Bridges
- Shapes
- Gravity
- Force
- Momentum
- Chain reaction

Skills (Objectives):

- Understand how architecture, engineering, design, and physical science affects building structures.
- Identify different types of bridges and build a bridge using lego-type brick pieces.
- Identify different shapes and explain how they affect architecture of a structure.
- Explain how to use shapes to solve beginner architecture problems.
- Explain how to use shapes to solve advanced architecture problems.
- Explain how gravity, force, momentum are used to build a beginner level chain reaction contraption.
- Explain how gravity, force, momentum are used to build an intermediate level chain reaction contraption.
- Explain how gravity, force, momentum are used to build an advanced level chain reaction contraption.

Interdisciplinary Connection(s):

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- L.WF.K.2 Demonstrate command of the conventions of encoding and spelling common, regular, single-syllable words.
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- L.VL.K.2. With prompting and support, ask and answer questions to help determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.
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- W.IW.K.2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts to convey ideas.
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NJSLS Social Studies

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- 6.1.5.CivicsHR.4: Identify actions that are unfair or discriminatory, such as bullying, and propose solutions to address such actions.

Stage 2: Assessment Evidence

Performance Task(s):	Other Evidence:
• Student classwork/projects • Student demonstration • Class/partner/group discussion • Self-assessments • Peer-assessments • Turn and Talk • Various class activities and games • Self-reflection • Exit tickets/questions	• Teacher observation • Student/Teacher conference

Stage 3: Learning Plan

Learning Opportunities/Strategies:	Resources:
Lesson 1: Understanding architecture and design using brick pieces Students will learn about architecture, engineering, design, and physical science through the Brick Building kit. They will learn how to use the bricks to build different types of structures. They will use strategies in critical thinking, problem solving, creativity, communication, and collaboration to complete building challenges.	Lesson 1: Understanding architecture and design using brick pieces • Lego Brick Building kit
Lesson 2:Understanding and building bridges Students will learn about different types of bridges. They will use the Brick Building Kit to build a bridge.	Lesson 2:Understanding and building bridges • Lego Brick Building kit

Technology Enrichment - Grade K

Lesson 3: Understanding shapes and architecture Students will learn about different shapes and how they can create composite shapes	Lesson 3: Understanding shapes and architecture ● Pattern Blocks Shape Maker
Lesson 4: Using shapes to solve problems Students will use what they learned about different shapes and composite shapes to create and solve composite shape shadows with a buddy	Lesson 4: Using shapes to solve problems ● Pattern Blocks Shape Maker
Lesson 5: Using shapes to solve advanced problems Students will use what they learned about different shapes and composite shapes to create and solve shape puzzles with specific criteria with a buddy	Lesson 5: Using shapes to solve advanced problems ● Pattern Blocks Shape Maker
Lesson 6: Understanding gravity, force, momentum to build a beginner level chain reaction contraption Students will learn about gravity, force, and momentum and build a beginning level chain reaction contraption using the Create-A-Chain Reaction kit.	Lesson 6: Understanding gravity, force, momentum to build a beginner level chain reaction contraption ● Create-A-Chain Reaction kit ● Sci Show Kids Forces
Lesson 7: Build intermediate level chain reaction Students will review concepts of gravity, force, and momentum to build an intermediate level chain reaction contraption using the Create-A-Chain Reaction kit.	Lesson 7: Build intermediate level chain reaction ● Create-A-Chain Reaction kit
Lesson 8: Build advanced level chain reaction Students will review concepts of gravity, force, and momentum to build an advanced level chain reaction contraption using the Create-A-Chain Reaction kit.	Lesson 8: Build advanced level chain reaction ● Create-A-Chain Reaction kit

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Adaptation of materials and requirements Elevated text or question complexity Independent student options Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	**Materials** Provide pictures Provide text in alternative formats, such as large print, audio formats, or digital text Use peer readers Permit highlighting of text List discussion questions prior to reading text	**Materials** Decreased text or question complexity Provide page numbers or highlighted texts Shorten assignments to focus on key concepts **Grading** Provide partial grade based on individual progress or effort Use recognition tests (true-false, multiple choice, or matching) instead of short answer

Technology Enrichment - Grade K

		Vocabulary lists and/or study guides Provide lecture notes/outline Provide model or example **<u>Environment</u>** Reduce visual or auditory distractions Preferential seating Post a visual schedule Emphasize multi-sensory learning **<u>Directions</u>** Use oral, recorded, and/or printed directions with pictures Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions **<u>Time</u>** Alert students before transitions Provide additional time for tasks Extra response time	Provide a vocabulary list with definitions Modified rubrics

Technology Enrichment

Pacing Guide

Grade K

Units	Unit TOTAL*	Cumulative TOTAL**
Unit 1 – Introduction to Technology and Digital Citizenship	**7 days**	**7 days**
Unit 2 – Navigation and Applications	**8 days**	**15 days**
Unit 3 – Coding	**7 days**	**22 days**
Unit 4 – STEM	**8 days**	**30 days**
		30 days

* Unit Total is inclusive of introduction, instruction, assessment for that particular topic.

** Cumulative Total is a running total, inclusive of prior and current topics.