



Library Media

Grade 4

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Board of Education Approved (pending), Effective Date: September 2020

Scope and Sequence

Month	Unit - Topic
September - Trimester 1	Unit 1
October - Trimester 1	
November - Trimester 1	
December - Trimester 2	Unit 2
January - Trimester 2	
February - Trimester 2	
March - Trimester 2/3	Unit 3
April - Trimester 3	
May - Trimester 3	
June - Trimester 3	

Library Media Standards - Progression of Learning - Disciplinary Concepts and Core Ideas

Unit 1-Life Literacy and Key Skills

Summary and Rationale

The purpose of this unit is for students to not only be effective/safe users of library media tools, but also to be an “upstander” to negative activity. Students will consider the importance of digital citizenship and that the lasting implications of online activity impact oneself and society. The unit emphasizes fostering positive digital footprints, managing digital identities responsibly, and addressing cyberbullying.

Recommended Pacing

Trimester 1 (September - November)

Standards

NJSLS 9.4 Life Literacies and Key Skills

Creativity and Innovation

9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity.
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Critical Thinking and Problem-Solving

9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
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Digital Citizenship

9.4.5.DC.1	Explain the need for and use of copyrights.
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9.4.5.DC.2	Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.
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9.4.5.DC.3	Distinguish between digital images that can be reused freely and those that have copyright restrictions.
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9.4.5.DC.4	Model safe, legal, and ethical behavior when using online or offline technology.
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9.4.5.DC.5	Identify the characteristics of a positive and negative online identity and the lasting implications of online activity.
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9.4.5.DC.6	Compare and contrast how digital tools have changed social interactions.
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9.4.5.DC.7	Explain how posting and commenting in social spaces can have positive or negative consequences.
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Information and Media Literacy

9.4.5.IML.2	Create a visual representation to organize information about a problem or issue.
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9.4.5.IML.4	Determine the impact of implicit and explicit media messages on individuals, groups, and society as a whole
9.4.5.IML.5	Distinguish how media are used by individuals, groups, and organizations for varying purposes.
9.4.5.IML.6	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions.
9.4.5.IML.7	Evaluate the degree to which information meets a need including social emotional learning, academic, and social.
Technology Literacy	
9.4.5.TL.3	Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.
9.4.5.TL.5	Collaborate digitally to produce an artifact.
Instructional Focus	
Enduring Understandings: <i>Students will understand that...</i>	Essential Questions:
EU 1.A: The Library Media Center is a place to access information and build new knowledge.	How can I become an effective user of the library media center?
EU 1.B: Software and Hardware work together to accomplish tasks	How can I practice safe and responsible behaviors online?
EU 1.C: Computers need to be used responsibly.	How can I use the computer to serve a purpose?
Evidence of Learning (Assessments)	
<p>PERFORMANCE ASSESSMENT(S) G.R.A.S.P.S</p> <p><i>Students will show that they really understand by evidence of...</i></p> <p>Be a Super Digital Citizen</p> <p>Goal: To demonstrate your understanding of cyberbullying and showcase strategies to be an "upstanding" digital citizen through a creative project.</p> <p>Role: You are a digital citizenship advocate and an ambassador for positive online behavior.</p> <p>Audience: Your audience includes your classmates, teachers, and any others who are interested in learning about cyberbullying and how to be an upstanding digital citizen.</p> <p>Situation: In today's digital world, cyberbullying has become a pressing issue affecting many individuals. As a 4th-grade digital citizenship advocate, you have been tasked with creating a project to educate and inspire others to combat cyberbullying and promote positive online behavior.</p> <p>Product/Performance: You will create a digital presentation, comic strip, poster, or video that showcases:</p> <ul style="list-style-type: none"> • Understanding of cyberbullying: Define cyberbullying, explain its impact on individuals and society, and provide examples. • Steps to be an upstanding digital citizen: Present strategies and actions one can take to address and prevent cyberbullying, and promote positive online behavior. Include scenarios demonstrating these strategies. 	

Standards for Success:

Your project should:

- Clearly define and explain cyberbullying with appropriate examples.
- Present at least three strategies to be an upstanding digital citizen.
- Include real-life scenarios illustrating the chosen strategies.
- Show creativity and originality in the presentation of the information.
- Be clear, organized, and easy to understand by the intended audience.

Additional Information:

- Use multimedia elements such as images, videos, or quotes to enhance your project.
- You can collaborate with classmates if you wish, but each individual must demonstrate their understanding in their submission.

Assessment Rubric:

Criteria	Excellent (4)	Proficient (3)	Basic (2)	Below Basic (1)
Understanding of Cyberbullying	Student clearly defines and explains cyberbullying with accurate examples, demonstrating a deep understanding.	Student defines and explains cyberbullying with some accurate examples.	Student attempts to define cyberbullying but lacks clarity or accuracy.	Student does not effectively define or explain cyberbullying.
Strategies for Upstanding Citizenship	Student presents three or more effective strategies to be an upstanding digital citizen with clear explanations and relevant scenarios.	Student presents at least three strategies with explanations but may lack clarity or relevance in scenarios.	Student presents fewer than three strategies with limited explanations and relevance in scenarios.	Student does not effectively present strategies for upstanding digital citizenship.
Creativity and Presentation	Project shows exceptional creativity, originality, and is well-organized with multimedia elements that greatly enhance understanding.	Project is creative, organized, and includes multimedia elements, enhancing overall presentation.	Project lacks some creativity, organization, or multimedia elements, impacting presentation.	Project lacks creativity, organization, or multimedia elements, making it difficult to understand.
Clarity and Understanding	Information presented is clear, concise, and easily understandable by the intended audience.	Information presented is mostly clear and understandable, but some areas may lack clarity.	Information presented is unclear or confusing, making it challenging for the audience to understand.	Information presented is very unclear or entirely confusing, hindering understanding.

This assessment allows students to showcase their understanding of cyberbullying and their ability to suggest strategies for being upstanding digital citizens in a creative and engaging manner.

Objectives (SLO)	
<p>ESSENTIAL KNOWLEDGE (EK) <i>Students will know...</i></p> <p>EK 1.A</p> <ul style="list-style-type: none"> ● Library media center ● Computers - keyboarding ● Dewey Decimal System <p>EK 1.B Super Digital Citizen</p> <ul style="list-style-type: none"> ● Online etiquette, safety, rights, and responsibilities ● Healthy Media Balance/Choices <ul style="list-style-type: none"> ○ “What? When? How Much?” Framework Strategy ● Cyberbullying awareness - being an upstander ● Digital identity management - digital footprint, social interaction ● Copyright <ul style="list-style-type: none"> ○ Attribution ○ Intellectual property rights ○ Public domain ○ Creative commons 	<p>LEARNING OBJECTIVES (LO) <i>Students will be skilled at...</i></p> <p>LO 1.A.1: Follow library media procedures, on the command of the library media specialist or on their own.</p> <p>LO 1.A.2: Locate and check-out appropriate reading materials.</p> <p>LO 1.A.3: Care for books and other library materials.</p> <p>LO 1.A.4: Log on to computer, utilize district-approved systems</p> <p>LO 1.A.5: Input information using keyboarding skills</p> <p>LO 1.B.1: Use computers and other technology devices in a responsible manner.</p> <p>LO 1.B.2: Define digital citizenship</p> <p>LO 1.B.3: Discuss scenarios reflecting positive and negative digital citizenship, and the importance of being an upstander</p> <p>LO 1.B.4: Define cyberbullying and its impact</p> <p>LO 1.B.5 Explain the difference between private and personal information and the risk of sharing private information online</p> <p>LO 1.B.6: Identify the online activities that contribute to your “digital footprint” (activity- create a positive digital footprint collage or comic)</p> <p>LO 1.B.7: Describe the positives and negatives of social interaction in online environments (texting, games, etc)</p> <p>LO 1.B.8: Research topics related to digital citizenship</p> <p>LO 1.B.9: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.</p> <p>LO 1.B.10: Distinguish between digital images that can be reused freely and those that have copyright restrictions.</p>
Suggested Lesson Resources/Technology Tools	
<p>1.A. Library Media Center Orientation SUGGESTED TIMEFRAME: 1-2 class periods</p> <ul style="list-style-type: none"> ● Review of library media routines and procedures ● Dewey Decimal System - Book check-out ● Schoology, Clever - Log into Schoology and other district programs using Nutley Schools credentials ● Keyboarding <ul style="list-style-type: none"> ○ Using Nutley Schools credentials to log into TypeTastic ○ Number Keys, shift and symbol keys <hr/> <p>1.B. Super Digital Citizen SUGGESTED TIMEFRAME: 8-9 class periods</p> <ul style="list-style-type: none"> ● Common Sense Media - My Media Choices <ul style="list-style-type: none"> ○ What makes a healthy media choice? ○ My Media Choices Common Sense Education ● Common Sense Media - Private and Personal Information <ul style="list-style-type: none"> ○ What information is okay to share online? 	

- Private and Personal Information | Common Sense Education
- Common Sense Media - Our Online Tracks
 - How does our online activity affect the digital footprints of ourselves and others?
 - Our Online Tracks | Common Sense Education
- Common Sense Media- Keeping Games Fun and Friendly
 - How can I be positive and have fun while playing online games, and help others do the same?
 - Keeping Games Fun and Friendly | Common Sense Education
 - Kahoot, Quizlet, Quizizz
- Common Sense Media- Be a Super Digital Citizen
 - How can we be upstanders when we see cyberbullying?
 - Be a Super Digital Citizen | Common Sense Education
 - Assessment
- Common Sense Media - Creator's rights and responsibilities
 - What rights and responsibilities do you have as a creator?
 - A Creator's Rights and Responsibilities | Common Sense Education
- ENRICHMENT - Common Sense Digital Passport games Digital Passport by Common Sense Education
- Classroom-Friendly Websites and Apps for Making Comics | Common Sense Education
- iPad Camera and other digital creation apps

Modifications

Special Education

- Students' personal device used to log in and access websites
- Flexible seating arrangements, and movement breaks
- Call student name before asking a question
- Extend wait time after asking question
- Scaffolded instructions
- Sensory modifications
- Frequent check-ins
- Extended time or modified assignments

ELL

- Spanish/multilingual book section of library
- Translated materials
- Visual aids
- Opportunities for language practice in groups, language buddies

Gifted and Talented

- Free reading time (in lieu of drill and practice routines)

504

- Preferential seating
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Behavior management support, movement breaks
- Provide a quiet space, if necessary, to minimize distractions
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Frequent check-ins
- Extended time or modified assignments

Virtual

- Utilize online learning platforms (i.e., Google Meet and Schoology) to meet with students virtually, with the goal of introductions and “get-to-know-you” as well as establishing routines/expectations for remote-virtual learning specific to library media.
- Virtual read-alouds and discussions about library media.
- The Assessment Goal Option 1 could utilize online resources to create and share comic strip

Career Readiness, Life Literacies, and Key Skills Practices

Please select all career readiness, life literacies, and key skills practices that apply to this unit of study:

- ✓ Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social, and economic impacts of decisions.
- ✓ Demonstrate creativity and innovation.
- ✓ Utilize critical thinking to make sense of problems and persevere in solving them.
- ✓ Model integrity, ethical leadership, and effective management.
- Plan education and career paths aligned to personal goals.
- ✓ Use technology to enhance productivity, increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

For more information: New Jersey Student Learning Standards - Career Readiness, Life Literacies, and Key Skills (pages 15-16)

Unit 2 - Digital Proficiency and Information Management

Summary and Rationale

This curriculum unit aims to equip students with essential skills and knowledge in digital proficiency and effective information management. Students will explore the functionalities of Google Drive and other Google Workspace tools, media resources, and basic computer programming concepts. The unit will focus on practical application, critical thinking, and problem-solving within digital environments. In addition, Students will understand more complex features of computer programming and algorithms.

Recommended Pacing

Trimester 2 (December - Mid-March)

Standards

NJSLS 8.1 Computer Science

Computing Systems

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.CS.3	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies.

Networks and the Internet

8.1.5.NI.1	Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2	Describe physical and digital security measures for protecting sensitive personal information

Impacts of Computing

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

Data and Analysis

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.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Algorithms and Programming	
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
8.1.5.AP.3	Create programs that include sequences, events, loops, and conditionals.
8.1.5.AP.4	Break down problems into smaller, manageable sub-problems to facilitate program development.
NJSLs 9.4 Life Literacies and Key Skills	
Digital Citizenship	
9.4.5.DC.1	Explain the need for and use of copyrights
9.4.5.DC.4	Model safe, legal, and ethical behavior when using online or offline technology.
9.4.5.DC.5	Identify the characteristics of a positive and negative online identity and the lasting implications of online activity.
9.4.5.DC.6	Compare and contrast how digital tools have changed social interactions.
9.4.5.DC.7	Explain how posting and commenting in social spaces can have positive or negative consequences.
Information and Media Literacy	
9.4.5.IML.1	Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).
9.4.5.IML.3	Represent the same data in multiple visual formats in order to tell a story about the data.
Technology Literacy	
9.4.5.TL.1	Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
9.4.5.TL.2	Sort and filter data in a spreadsheet to analyze findings.
9.4.5.TL.3	Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.
Instructional Focus	
Enduring Understandings: <i>Students will understand that...</i>	Essential Questions:
EU 2.A: Google Drive's main purpose is to store files and sync them to your computer. Google Workspace provides the user with word processing and presentation software that is easily shared.	How can I use Google tools effectively? In what ways do different types of media resources (e.g., articles, videos, databases) cater to specific information needs,

EU 2.B: Media resources provide access to vast stores of information and specific situations require the use of relevant sources of information

EU 2.C: Computer programmers can read and modify scripts to change what happens on the screen.

and how can individuals effectively utilize these resources to address diverse problems or inquiries?

What are the fundamental principles underlying script modification, and how does this understanding contribute to creating innovative solutions or enhancements in software applications or digital interfaces?

Evidence of Learning (Assessments)

PERFORMANCE ASSESSMENT(S) G.R.A.S.P.S

Students will show that they really understand by evidence of...

In this project, students will apply their knowledge of Google tools, including Gmail, Google Drive, Docs, Sheets, and Forms, to complete various tasks. They will learn how to use Gmail effectively, practice email etiquette, create a Google Form quiz based on their research, collect and analyze data using Google Sheets, and present their findings using Google Slides.

Project Tasks:

Task 2: Research and Google Forms Creation

- Students choose a topic of interest on a local or global issue and conduct research (suggested: Natural Disasters - aligns to ELA curriculum).
- Based on their research, students create a 5-question Google Survey or Quiz related to their chosen topic.
- The questions should be clear, engaging, and demonstrate understanding of the topic.

Task 3: Understanding Gmail Functions and Email Etiquette

- Model the functions of Gmail, demonstrating how to compose, send, and receive emails.
- Teach email etiquette using resources like the provided link: "Email Etiquette for Elementary Students."
- Students will write an email to a designated group and CC the instructor, applying the email etiquette rules learned.
- The email will be a brief summary of their research and include a link to the Google Form.
- Students will then respond to one of the emails, asking any questions or addressing the content, while maintaining proper etiquette.

Task 4: Data Collection and Presentation

- Students distribute their Google Forms to classmates to collect data (via email).
- Using the responses gathered, students organize and analyze the data in a Google Sheet.
- Using Google Sheets, create a graph that represents the collected data in an easily understandable and visually appealing way.
- Utilize Google Slides to design a presentation showcasing the collected data using the Google Sheets graph.
- Present their findings to the class, explaining the data and insights gained from the survey.

Project Assessment:

- Research and Google Forms Survey/Quiz: Evaluate the appropriateness of questions, relevance to the topic, and the clarity of the quiz created.
- Email Etiquette Assessment: Assess students' email writing skills and adherence to email etiquette by evaluating the emails sent and received.
- Data Collection and Analysis: Assess the completeness and accuracy of data collected, as well as the students' ability to interpret and represent data using Google Sheets.
- Data Presentation: Evaluate the creativity, clarity, and effectiveness of the presentation created using Google Slides to display the data.

Objectives (SLO)

<p>ESSENTIAL KNOWLEDGE (EK) <i>Students will know...</i></p> <p>EK 2.A</p> <ul style="list-style-type: none"> ● Follett, Databases ● Google Drive ● File Naming/Sharing ● Permissions ● Responding to comments ● Slides ● Google Images ● Main points on a slide ● Transitions ● Google Forms ● Google Docs ● Google Sheets ● Google Slide ● Gmail <p>EK 2.B</p> <ul style="list-style-type: none"> ● IP Address ● URL ● Internet ● Servers ● Wi-Fi ● Bias of Information <p>EK 2.C</p> <ul style="list-style-type: none"> ● Computer programming: Algorithms, loops, values, command 	<p>LEARNING OBJECTIVES (LO) <i>Students will be skilled at...</i></p> <p>LO 2.A.1: Identify and access Follet Destiny icon on desktop, and other school databases.</p> <p>LO 2.A.2: Utilize search features and input a query into databases.</p> <p>LO 2.A.3: Provide proper citations</p> <p>LO 2.A.4: Digital tools in Google Workspace</p> <ul style="list-style-type: none"> ● Create and rename a document ● Respond to teacher comments on work ● Identifying key information to use on a Google Slide ● Use transitions on slides to create a visual experience for audience ● Send and receive emails using GMail, with proper etiquette ● Create and format a Google Doc ● Create a Google Form Quiz and use it to collect data ● Create a Google Sheet to display data using formulas and graphs ● Present information via Google Slides ● Securing information <p>LO 2.B.1: Identify research needs and select the most efficient software program and websites to meet that need.</p> <p>LO 2.B.2: Understand how sending messages over the internet includes chunks of information that flow through many channels.</p> <p>LO 2.B.3: Recognize that every message on the internet goes to a server which has a number that identifies it.</p> <p>LO 2.C.1: Understand that computer programs may involve not knowing how many times to repeat a command, however, they can be programmed to know when to stop or when to keep going.</p> <p>LO 2.C.2: Repeat/loop a command</p>
<p>Suggested Lesson Resources/Technology Tools</p>	
<p>2.A. SUGGESTED TIMEFRAME: 4-5 class periods</p> <ul style="list-style-type: none"> ● Sending and Receiving emails though G Mail <ul style="list-style-type: none"> ○ Model the functions of G Mail ○ Teach email etiquette: <ul style="list-style-type: none"> ■ Email Etiquette for Elementary Students - Rockin Resources ○ Students will write an email to a partner/group and CC the instructor. They will then respond to their partner’s email. ● Collecting Data using Google Forms <ul style="list-style-type: none"> ○ Students will come up with a topic they are interested in and research that topic using PebbleGo and/or other databases. Students will create a 5 question Google Forms Quiz on the topic they research. ○ Collect the data from classmates and create a Google Sheet 	

- Find a creative way (using a Google Sheets Graph and a Google Slide) to display the data and present it to the class.
- 4th Grade Google Form Lesson *MASTER COPY*

2.B. SUGGESTED TIMEFRAME: 3-4 class periods

- The Internet The Internet
- How does the internet work? | The Kid Should See This

2.C. SUGGESTED TIMEFRAME: 3-4 class periods

- Farmer <https://curriculum.code.org/csf-20/coursed/13/>
- Kodable
- Code.org
- Google made with Code
- Scratch

Modifications

Special Education

- Students' personal device used to log in and access websites
- Flexible seating arrangements, and movement breaks
- Call student name before asking a question
- Extend wait time after asking question
- Scaffolded instructions
- Sensory modifications
- Frequent check-ins
- Extended time or modified assignments

ELL

- Spanish/multilingual book section of library
- Translated materials
- Visual aids
- Opportunites for language practice in groups, language buddies

Gifted and Talented

- Free reading time (in lieu of drill and practice routines)
- Advanced coding

504

- Preferential seating
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Behavior management support, movement breaks
- Provide a quiet space, if necessary, to minimize distractions
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Frequent check-ins
- Extended time or modified assignments

Virtual

- Utilize online learning platforms (i.e., Google Meet and Schoology) to meet with students virtually, with the goal of introductions and “get-to-know-you” as well as establishing routines/expectations for remote-virtual learning specific to library media.

- Virtual read-alouds and discussions about library media.

Career Readiness, Life Literacies, and Key Skills Practices

Please select all career readiness, life literacies, and key skills practices that apply to this unit of study:

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- Consider the environmental, social, and economic impacts of decisions.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them.
- Model integrity, ethical leadership, and effective management.
- Plan education and career paths aligned to personal goals.
- Use technology to enhance productivity increase collaboration and communicate effectively.
- Work productively in teams while using cultural/global competence.

For more information: New Jersey Student Learning Standards - Career Readiness, Life Literacies, and Key Skills (pages 15-16)

Unit 3 - Design Thinking

Summary and Rationale

This unit is designed to immerse students in the world of engineering by engaging them in hands-on activities focused on creating a zipline and/or a cotton ball launcher. Students will delve into the Engineering Design Process (EDP) while utilizing scientific vocabulary such as force, friction, motion, gravity, potential energy, and kinetic energy to comprehend and explain the functionality of their designs. By encouraging collaboration, embracing failure as a learning opportunity, and fostering perseverance, students will not only grasp scientific concepts but also develop problem-solving skills crucial in the world of engineering and innovation.

Recommended Pacing

Trimester 3 (Mid-March - June)

Standards

NJSLS 8.2 Design Thinking

Engineering Design

8.2.5.ED.1	Explain the functions of a system and its subsystems.
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.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
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.ED.5	Describe how specifications and limitations impact the engineering design process
8.2.5.ED.6	Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.

Interaction of Technology and Humans

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

8.2.5.NT.1	Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.
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Effects of Technology on the Natural World

8.2.5.ETW.1	Describe how resources such as material, energy, information, time, tools, people, and capital are used
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	in products or systems.
8.2.5.ETW.2	Describe ways that various technologies are used to reduce improper use of resources.
8.2.5.ETW.3	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
8.2.5.ETW.4	Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.
8.2.5.ETW.5	Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change
Ethics and Culture	
8.2.5.EC.1	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.
NJSLS 9.4 Life Literacies and Key Skills	
Creativity and Innovation	
9.4.5.CI.4	Research the development process of a product and identify the role of failure as a part of the creative process.
Critical Thinking and Problem-Solving	
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
Instructional Focus	
Enduring Understandings: <i>Students will understand that...</i>	Essential Questions:
EU 3.A: The Engineering Design Process involves defining a problem, brainstorming solutions, designing, building, testing, evaluating, and redesigning. EU 3.B: Failures are an important part in the design process. EU 3.C: Engineers create and modify technologies to meet people's needs and wants	How can we work effectively in groups, share ideas, and consider various perspectives to arrive at the best solutions? How can we embrace failures as learning opportunities, troubleshoot non-working designs, and persist in finding solutions? How do societal needs and desires shape the development and function of products?
Evidence of Learning (Assessments)	

PERFORMANCE ASSESSMENT(S) G.R.A.S.P.S

Students will show that they really understand by evidence of...

Students will be assessed based on their understanding of scientific concepts related to the designs, their application of the Engineering Design Process, collaboration with peers, documentation of the design process, and the ability to troubleshoot and improve non-functional designs.

- Students will demonstrate their understanding of the engineering concepts by explaining how force, friction, motion, gravity, potential energy, and kinetic energy are involved in the functioning of their zipline and/or launcher designs.
- Assess their journals and documentation of the design process, focusing on their application of the EDP, problem-solving, and teamwork skills.
- Presentation: Each group presents their final designs, explaining the engineering principles behind them and showcasing their improvements over the iterations.

Option 1: Zipline Challenge

Students will engage in the creation of a zipline, applying concepts of force, friction, gravity, and motion to transport an object from a higher point to a lower point within specified time and distance constraints. They will document their process and iterate on their designs to achieve optimal speed and efficiency.

Build | Zip Line . DESIGN SQUAD GLOBAL | PBS KIDS

Goal: Students will be able to use the terms force, friction, motion, and gravity to explain a zipline.

Role: You are a superhero

Audience: Teachers and peers

Situation: Someone needs your help to quickly get to the bottom of a hill. Students will collaborate and design a zip line that will transport this object at least 20 ft from the top to the bottom under five seconds. They will test and resign based on failures and successes.

Product: Students will construct a zip line using certain materials.

Standards/Criteria: Students will work collaboratively with their group to carefully choose their supplies and journal their progress through the Engineer Design Process as they design a zipline for maximum speed.

Option 2: Cotton Ball Launcher Challenge

Students will design and build a launcher to project a cotton ball as far as possible, utilizing concepts of potential and kinetic energy. They will experiment with various designs, test their launchers, collect data, and revise their models to enhance performance.

Goal: Students will be able to use the terms mechanical engineer potential energy and kinetic energy and to explain a launcher.

Role: You are an mechanical or aerospace engineer

Audience: Teacher and peers

Situation: Students will examine examples of launchers (i.e. diving board, ball thrower) to design their own launcher to see how far a cotton ball can be “launched”

Product: Design and construct a launcher that will determine how far a cotton ball is projected.

Standards/Criteria: Students will work collaboratively in groups using only the supplies provided. Through the design process students will use constraints and open-ended problem solving.

Option 3: Hurricane House

Goal: Understand the forces of nature that can affect the stability of a structure.

Role: Engineer

Audience: Peers and teacher

Situation: Design a prototype house that can withstand hurricane force winds.

Product: Effective and persuasive presentation of data and information.

Standards and Criteria: You must test and present your prototype, record observations in a journal. Complete the observation rubric.

Objectives (SLO)

ESSENTIAL KNOWLEDGE (EK)

Students will know...

EK 3.A

- The Engineering Design Process
- Collaboration and communication is a key factor in design challenges

EK 3.B

- Failures are an important part in the design process that lead to troubleshooting and revision of design.
- Gravity needs to be considered in engineering design requirements due to the limitations it imposes on structures.

EK 3.C

- Societal needs and wants
- Environmental issues and natural disasters require engineers to reflect on designs and modify structures.
- Scientific concepts impact design: Gravity, force, friction, motion, safety, speed, distance, potential and kinetic energy, wind speed, air pressure, and structural stability

LEARNING OBJECTIVES (LO)

Students will be skilled at...

LO 3.A.1: Name and apply the steps of the engineering design process

LO 3.A.2: Collaborate in a small group towards a common goal or solution

LO 3.B.1: Engineering involves considering failure as a unique opportunity to learn and improve one's innovation.

LO 3.B.2: Constructing designs that allow for gravity.

LO 3.C.1: Collaborate effectively with peers to brainstorm solutions that consider societal needs and wants.

LO 3.C.2: Recognize the influence of societal needs and desires in shaping product development and functionality.

LO 3.C.3: Embrace failure as an opportunity for improvement and innovation to meet societal needs.

LO 3.C.4: Use scientific terms to explain a design.

LO 3.C.5: Explain the impact of engineering/technology on the environment.

LO 3.C.6: Analyze how technology has contributed to or reduced inequities.

Suggested Lesson Resources/Technology Tools

3.A. SUGGESTED TIMEFRAME: 2-3 class periods

- Who engineered it from family engineering book
- Home . DESIGN SQUAD GLOBAL | PBS KIDS
- Mini Builds
- Introduction to Engineering: Discuss the role of engineers in designing solutions to problems. Introduce key terms like force, friction, motion, gravity, potential energy, kinetic energy, .
- Engaging Activities: Conduct experiments and activities that demonstrate the concepts of force, motion, and gravity. For example, exploring how different surfaces affect friction or experimenting with simple machines like pulleys and levers.

- Brainstorming Session: Divide students into groups and introduce the challenge scenarios – building a zipline and creating a cotton ball launcher. Encourage them to brainstorm initial ideas and discuss possible designs.

3.B. SUGGESTED TIMEFRAME: 3-4 class periods

- Succeed by Failing Crash Course Kids #11
- Fixing Failure points Crash Course Kids #12
- Family Engineering - Hot Chocolate Machine pp. 122-125
- Family Engineering - Launcher pp. 126-128

3.C. SUGGESTED TIMEFRAME: 3-4 class periods

Zip line activity

- Design Process: Introduce the Engineering Design Process (EDP) - Define the problem, brainstorm, design, build, test, and redesign.
- Zipline Construction: Provide materials (e.g., strings, pulleys, small objects as loads) and allow students to start constructing their zipline designs. Emphasize the need for safety, speed, and distance covered.
- Testing and Redesign: Students test their ziplines, analyze the results, and iterate on their designs to improve speed and efficiency. Encourage them to keep detailed journals documenting their process.

Launcher activity

- Introduction to Potential and Kinetic Energy: Explain the concepts of potential and kinetic energy using real-life examples. Discuss how they relate to the launcher challenge.
- Launcher Construction: Provide materials (e.g., cardboard, rubber bands, popsicle sticks) and guide students in designing and building their cotton ball launchers.
- Testing and Improvement: Students test their launchers to determine how far they can project a cotton ball. They collect data, analyze the results, and revise their designs to optimize performance.

Hurricane House activity

- Introduction to Hurricanes: Explore the characteristics of hurricanes, their formation, and their impact on communities. Discuss safety measures and the importance of preparedness.
- Scientific Concepts: Introduce scientific concepts such as wind speed, air pressure, and structural stability in relation to hurricanes.
- Case Studies: Analyze past hurricanes and their effects on different regions, emphasizing the need for resilient structures.
- Research and Planning: Students conduct research on hurricane-resistant structures and materials. They brainstorm ideas and sketch designs for their Hurricane Houses.
- Construction Phase: Provide materials (e.g., cardboard, glue, straws, etc.) for students to build their Hurricane House models based on their designs. Encourage creativity and structural stability in their constructions.
- Testing Phase: Simulate hurricane conditions using a fan or airflow to test the resilience of the Hurricane Houses. Measure wind speeds and observe how well each model withstands the 'hurricane.'
- Analysis of Results: Students analyze data from the testing phase, evaluating the effectiveness of their designs. Discuss what worked well and areas for improvement.
- Redesign and Improvement: Based on their analysis, students redesign and modify their Hurricane Houses to enhance resilience.
- Presentation: Each group presents their final Hurricane House designs, explaining their engineering choices, modifications, and how their structure addresses hurricane safety.

- The origin of hurricanes. How are they formed? What are the processes that lead to their formation? Make a detailed description of these and help your classmates understand.
- Present the five deadliest hurricanes in the history of the USA. Katrina is just one of them, talk to your class about the others and point out the differences and similarities.
- Economic damage of Hurricane Katrina.
- Survival kit. Especially in the following months of the tragedy the authorities tried to educate the population about having a survival kit. A backpack filled with food and essential objects can save your life. Discuss about what objects you should have in your kit.
- Reconstruction. The government and other countries became actively involved in the reconstruction after the crisis passed. Their efforts paid off, and they could rebuild cities in just a matter of months.
- Hurricane Model
- Mystery Science extended research
- Engineering Design Process to create hurricane-safe structure
- Using research and knowledge of materials and design to create a structure that will withstand the wind speed of a leaf blower at various distances to simulate Hurricane categories (tropical storm-Category 5)
- Video of Hurricane House Project
- Hurricane House Parameters pdf
- Students can come up with a list of different technologies that relate to hurricane protection.
- Have them write down their ideas and how they could be used to protect people in the event of hurricanes..
- What other designs have engineers used to prevent emergencies (For example, in San Francisco, engineers design buildings to meet earthquake codes.)
- Levees for protecting against flooding
- Boats to rescue people during floods
- Meet SlothBot: the cutest robot fighting climate change | CNN

Modifications

Special Education

- Students' personal device used to log in and access websites
- Flexible seating arrangements, and movement breaks
- Call student name before asking a question
- Extend wait time after asking question
- Scaffolded instructions
- Sensory modifications
- Frequent check-ins
- Extended time or modified assignments, such as less constraints on design projects

ELL

- Spanish/multilingual book section of library
- Translated materials
- Visual aids
- Opportunites for language practice in groups, language buddies

Gifted and Talented

- Modified assignments, such as more constraints on Design projects

- Preferential seating
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Behavior management support, movement breaks
- Provide a quiet space, if necessary, to minimize distractions
- Accessible materials, as per student needs (large print, audio, digital texts, etc.)
- Frequent check-ins
- Extended time or modified assignments

Virtual

- Utilize online learning platforms (i.e., Google Meet and Schoology) to meet with students virtually.
- Virtual read-alouds, demonstrations, and discussions about library media.
- The Assessment Goal Option 1 watch NASA paper airplanes youtube video. Chose three from model site and explain how gravitational force effects each one's flight
 - Paper Airplane Designs
 - How to make a paper plane, with science! | Do Try This At Home | We The Curious

Career Readiness, Life Literacies, and Key Skills Practices

Please select all career readiness, life literacies, and key skills practices that apply to this unit of study:

- Act as a responsible and contributing community member and employee.
- Attend to financial well-being.
- ✓ Consider the environmental, social, and economic impacts of decisions.
- ✓ Demonstrate creativity and innovation.
- ✓ Utilize critical thinking to make sense of problems and persevere in solving them.
- ✓ Model integrity, ethical leadership, and effective management.
- Plan education and career paths aligned to personal goals.
- ✓ Use technology to enhance productivity increase collaboration and communicate effectively.
- ✓ Work productively in teams while using cultural/global competence.

For more information: New Jersey Student Learning Standards - Career Readiness, Life Literacies, and Key Skills (pages 15-16)