Innovation Lab Grade 3

Unit Title: Unit 1: Digging into STEAM

Stage 1: Desired Results

Standards & Indicators:

NJSLS Mathematics

- **MP.2**: Reason abstractly and quantitatively.
- **MP.4**: Model with mathematics.
- **MP.5**: Use appropriate tools strategically.
- **3.M.B.4**: Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).
- **3.M.C**: Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- **3.M.C.6**: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

NJSLS Science

- **3-5-ETS1-1**: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2**: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3**: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

NJSLS Computer Science and Design Thinking

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

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.5.CT.3	Describe how digital tools and technology may be used to solve problems.	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.	
9.4.5.DC.1	Explain the need for and use of copyrights.	Intellectual property rights exist to protect the original works of individuals. It is allowable to use

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9.4.5.DC.2	Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.	other people's ideas in one's own work provided that proper credit is given to the original source.
9.4.5.DC.3	Distinguish between digital images that can be reused freely and those that have copyright restrictions.	
9.4.5.DC.4	Model safe, legal, and ethical behavior when using online or offline technology.	Sending and receiving copies of media on the internet creates the opportunity for unauthorized use of data, such as personally owned video, photos, and music.
9.4.5.DC.5	Identify the characteristics of a positive and negative online identity and the lasting implications of online activity.	Digital identities must be managed in order to create a positive digital footprint.
9.4.5.DC.6	Compare and contrast how digital tools have changed social interactions.	Digital tools have positively and negatively changed the way people interact socially.
9.4.5.DC.7	Explain how posting and commenting in social spaces can have positive or negative consequences.	
9.4.5.DC.8	Propose ways local and global communities can engage digitally to participate in and promote climate action.	Digital engagement can improve the planning and delivery of climate change actions.
9.4.5.IML.1	Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., Social Studies Practice - Gathering and Evaluating Sources).	Digital tools and media resources provide access to vast stores of information, but the information can be biased or inaccurate.
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.	Different digital tools have different purposes.
9.4.5.TL.5	Collaborate digitally to produce an artifact	Collaborating digitally as a team can often develop a better artifact than an individual working alone.

Central Idea/Enduring Understanding:

- STEAM is a combination of science, technology, engineering, arts, and mathematics used to solve real world problems with hands-on collaborative learning.
- A digital citizen is someone who uses the internet and other digital technology to responsibly participate within their community.

Essential/Guiding Question:

- What is STEAM and why is it important?
- What does it mean to be a responsible digital citizen?
- What is coding and how does it impact my life?

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• Coding is a basic literacy language used to communicate in the digital world. It is the set of digital commands needed for technology to work.	
Content: Week 1 - Intro to STEAM (procedures and creating a class rubric) Week 2 - What does STEAM look like and what does the T mean in STEAM? Week 3 & 4- Digital citizenship and chromebook introduction/shortcuts/and care (commonsensemedia.org lessons) Week 5 - Code intro and program tied to coding robot Week 6 - Practice coding using coding software Week 7 - Coding task trials Week 8 - Coding presentation/reflection/assessment	**Skills (Objectives):** • Define STEAM and how it can be useful in my life. • Explain & demonstrate ways to be a responsible digital citizen. • Define coding and how it is used in the real world. • Use code to program a robot to complete assigned tasks.

Interdisciplinary Connections:

Interdisciplinary curriculum coordination will be done with other departments on a regular basis. The nature of the Innovation Lab (STEAM driven) discipline incorporates:

- Real world, hands-on, collaborative learning experiences involving science, technology, engineering, arts, and mathematics (STEAM)
- Basic principles of algebra, geometry, chemistry, electricity, and physics through real world learning experiences designed to develop critical thinking, collaborative and problem solving skills.
- Opportunity to discover, create, and own solutions to real-world problems while using the latest technologies.
- Leadership and problem solving skills through collaborations and presentations.

NJSLS ELA Standards

- **L.KL.3.1. Use knowledge of language and its conventions when writing, speaking, reading, or listening.**
- **L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.**
- **RI.CR.3.1. Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.**
- **RI.IT.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.**
- **RI.TS.3.4. Utilize and reference features of a text when writing or speaking about a text, using text features (e.g., graphics, images, captions, headings) and search tools (e.g., key words, sidebars, hyperlinks) to locate and integrate information relevant to a given topic efficiently.**
- **RI.MF.3.6. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).**
- **RI.CT.3.8. Compare and contrast the elements of informational texts regarding the most important points and key details presented in two texts on the same topic.**
- **W.AW.3.1. Write opinion texts to present an idea with reasons and information.**

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- **W.IW.3.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.**
- **W.WP.3.4. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. With adult and peer feedback, and digital or print tools such as a dictionary, thesaurus, and/or spell checker, find and correct errors and improve word choice.**
- **W.WR.3.5. Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.**
- **W.SE.3.6. Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.**
- **W.RW.3.7. Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.**
- **SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.**

Stage 2: Assessment Evidence

Performance Task(s):

- Presentation of coded robot.
- Completing a given task.

Other Evidence:

- Weekly STEAM reflection log (exit ticket)
- Rubric
- Classroom discussions/participation

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Week 1 - Intro to STEAM (procedures and creating a class rubric). Establish classroom procedures and expectations.

Week 2 - What does STEAM look like and what does the T mean in STEAM?
Defining the history and present term of the word technology. Give examples of technology and how we use it.

Week 3 & 4- Digital citizenship and chromebook introduction/shortcuts/and care

Week 5 - Code intro and program tied to coding robot

Resources:

- Commonsensemedia.org
- procedure slide show
- Chromebooks
- STEAM logs/rubric (exit ticket)
- KWL chart about the term technology
- articles/books/videos about technology
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Commonsensemedia.org lessons
- Chromebook shortcut poster
- Chromebook care video
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Resources TBD
- Code.org
- Coding programs
- Instructional supporting videos
- Chromebooks
- STEAM logs/rubric (exit ticket)

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	• Learn how to use the video recording on the chromebook • Keva Bot/Create-A-Maze
Week 6 - Practice coding using coding software	• Resource TBD • Code.org • Coding programs • Instructional supporting videos • Chromebooks • STEAM logs/rubric (exit ticket) • Keva Bot/Create-A-Maze
Week 7 - Coding task trials	• Resource TBD • Complete task assigned with robot • Rubric • Make a video • Chromebooks • STEAM logs/rubric (exit ticket) • Keva Bot/Create-A-Maze
Week 8 - Coding presentation/reflection/assessment	• Chromebooks • Present video • STEAM logs/rubric (exit ticket)
Each class will follow this format: ○ Do Now activity ○ Direct instruction ○ Discussion/Model ○ Apply concepts ○ Allow time for independent exploration	• Misc: • Guest presenters: when available/if applicable

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
STEAM Reflection Log Extension Tasks Adaptation of materials and requirements Elevated text or question complexity Independent student options	STEAM Reflection Log Varying instructional strategies In-class interventions Compacting activity	STEAM Reflection Log **Materials** Provide text in alternative formats, such as Braille, large print, audio formats, or digital text Use peer readers Permit highlighting of text	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing

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Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Extend or abbreviate duration of assignments	List discussion questions prior to reading text Vocabulary lists and/or study guides Provide lecture notes/outline **<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 Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions Scaffolded Instruction **<u>Time</u>** Alert students before transitions Provide additional time for tasks Extra response time	ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 2: Making Connections

Stage 1: Desired Results

Standards & Indicators:

NJSLS Mathematics

- **MP.2**: Reason abstractly and quantitatively.
- **MP.4**: Model with mathematics.
- **MP.5**: Use appropriate tools strategically.

NJSLS Science

- **ETS1.A**: Defining and Delimiting Engineering Problems Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.
- **ETS1.B**: Developing Possible Solutions
    - Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
    - At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
    - Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)
- **ETS1.C**: Optimizing the Design Solution Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

- **3-5-ETS1-2**: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3**: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

NJSLS Computer Science and Design Thinking

- **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.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.
- **8.2.5.ITH.4**: Describe a technology/tool that has made the way people live easier or has led to a new business or career.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand	Curiosity and a willingness to try new ideas (intellectual

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	one's thinking about a topic of curiosity	risk-taking) contributes to the development of creativity and innovation skills.

Central Idea/Enduring Understanding:

- STEAM is a combination of science, technology, engineering, art and mathematics used to solve real world problems with hands-on collaborative learning.
- In a series circuit, there is only one pathway for the current, but in a parallel circuit there are two or more pathways for it.

Essential/Guiding Question:

- What is STEAM and why is it important?
- What is electricity?
- What makes a circuit work?
- What is a switch?
- What is the difference between an open and closed electric circuit?
- What is the difference between a series and parallel circuit?

Content:

Week 1 - Introduction
Week 2 - Circuits, Insulators and Conductors.
Week 3 - Electricity Scavenger Hunt
Week 4 - Videoing Introduction and Procedures
Week 5 -Build Circuit.
Week 6 - Create your own circuit
Week 7 - Create your own circuit.
Week 8- Presentation

Skills (Objectives):

- Students will be able to describe how a circuit works.
- Students will be able to follow directions to create different kinds of circuits.
- Students will be able to design their own circuit.
- Areas emphasized: building, testing, and troubleshooting circuits, and the basic physics of electricity.

Interdisciplinary Connections:

NJSLS ELA

- **L.KL.3.1. Use knowledge of language and its conventions when writing, speaking, reading, or listening.**
- **L.VL.3.2. Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.**
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- **W.WP.3.4. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. With adult and peer feedback, and digital or print tools such as a dictionary, thesaurus, and/or spell checker, find and correct errors and improve word choice.**

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- **W.WR.3.5. Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.**
- **W.SE.3.6. Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.**
- **W.RW.3.7. Engage in independent and task-based writing for both short and extended periods of time, producing written work routinely.**
- **SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.**

Stage 2: Assessment Evidence

Performance Task(s):

- Presentation of completed alternative energy projects
- Completed assessment on parts of the snap circuit kit

Other Evidence:

- Weekly STEAM reflection log (exit ticket)
- Rubric
- Classroom discussions/participation
- Class activities showing knowledge of alternative energy and electricity.

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Week 1 - Introduction to electricity and snap circuits (switches, circuits). Material exploration.

Week 2 - Series vs. parallel circuits. Insulators and conductors. Project # TBD

Week 3 - Explore electricity all around. Take a school scavenger hunt to find ways electricity is being used. Project # TBD

Week 4 - Intro procedure and modeling videoing for circuit project build. Practice using chromebook to record, project #TBD

Week 5 - Complete project TBD and practice recording giving objective and explanation.

Resources:

- Chromebook
- STEAM Log
- Snap Circuits snaptricity Kit
- Mentor Text
- KWL Chart on energy
- Chromebooks
- STEAM Log
- Snap Circuits snaptricity Kit
- Scavenger Hunt Worksheet- https://docs.google.com/document/d/1zjbtN0CfCuRTaaMmPhyZy0Gj7DJzLm49W-sj-EUTb00/edit?usp=sharing
- STEAM Log
- Chromebooks
- Snap Circuits snaptricity Kit
- https://www.youtube.com/watch?v=HOFp8bHTN30 (What is a circuit?)
- STEAM Log
- Chromebooks
- Snap Circuits snaptricity Kit
- Chromebooks
- STEAM Log
- Snap Circuits snaptricity Kit

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Week 6 - Create your own circuit. Identify type of circuit. Record the path the electricity flows through using Chromebook camera. Week 7 - Create your own circuit. Identify type of circuit. Record the path the electricity flows through using Chromebook camera. Week 8- Presentation of video.	• Chromebooks • STEAM Log • Snap Circuits snaptricity Kit • Chromebooks • STEAM Log • Snap Circuits snaptricity Kit • Chromebooks • STEAM Log • Snap Circuits snaptricity 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
STEAM Reflection Log Extension Tasks 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	STEAM Reflection Log Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	STEAM Reflection Log **Materials** Provide text in alternative formats, such as Braille, 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 **Environment** Reduce visual or auditory distractions Preferential seating Post a visual schedule Emphasize multi-sensory learning **Directions**	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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

Unit Title: Unit 3: Learning with Legos

Stage 1: Desired Results

Standards & Indicators:

NJSLS Mathematics

- **MP.2**: Reason abstractly and quantitatively.
- **MP.4**: Model with mathematics.
- **MP.5**: Use appropriate tools strategically.
- **3.M.A**: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- **3.DL.B**: Represent and interpret data.

NJSLS Computer Science and Design Thinking

- **8.1.5.NI.1**: Develop models that successfully transmit and receive information using both wired and wireless devices.
- **8.1.5.DA.1**: Collect, organize and display data in order to highlight relationships or support a claim.
- **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**: Purpose cause and effect relationships, predict outcomes, or communicate ideas using data.
- **8.1.8.AP.6**: Refine a solution to meet users' needs by incorporating feedback from team members and users.
- **8.1.8.AP.8**: Systematically test and refine programs using a range of test cases and users.

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NJSLS Art

- **1.2.5.CR1F**: Brainstorm goals and plans for a media art audience.
- **1.2.5.CR2B**: Model ideas, plan in an effective direction.
- **1.2.5.CR2C**: Brainstorm goals and plans for a media art audience.
- **1.2.5.CR3C**: Explore how elements and components can be altered for clear communication and intentional effects, point of view, perspective, and refine media artworks to improve clarity and purpose.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.	An individual's passions, aptitude and skills can affect his/her employment and earning potential
9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.	
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.	Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.

Central Idea/Enduring Understanding:

- STEAM is a combination of science, technology, engineering, art and mathematics used to solve real world problems with hands-on collaborative learning.
- Investigate the effects of balanced and unbalanced forces using Legos.

Essential/Guiding Question:

- What is STEAM and why is it important?
- Which creation can do the best running, jumping or throwing?

Content:

Week 1 - Lego Learning and Exploration
Week 2 - Track and Field
Week 3 - Tightrope Walker
Week 4 - Relay Race
Week 5 - Stop Motion Introduction
Week 6 - Stop Motion Recording
Week 7 - Presentation/reflection/assessment

Skills (Objectives):

- Explore how pushing and pulling affects a mechanism's motion and speed.
- Make predictions about how the forces acting on an object can change its motion.
- Study and apply the process of stop-animation.

Interdisciplinary Connections:

NJSLS Anchor Standards & Indicators for Reading

- **RI 3.4** Determine the meaning of a general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.
- **RF 3.4.A** Read grade level text with purpose and understanding
- **RF 3.4.C** Use context to confirm or self correct word recognition and understanding, rereading as necessary

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NJSLS Anchor Standards & Indicators for Writing

- **NJSLSA.W1** Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
- **NJSLSA.W4** Produce clear and coherent writing in which the development, organization, and style are appropriate to tasks, purpose, and audience
- **NJSLSA.W6** Use technology, including the internet, to produce and publish writing and to interact and collaborate with others.
- **NJSLSA.W8** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source and integrate the information while avoiding plagiarism.
- **NJSLSA.W9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
- **NJSLSA.W10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

NJSLS Anchor Standards & Indicators for Speaking and Listening

- **NJSLSA.SL1:** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- **NJSLSA.SL2**: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
- **NJSLSA.SL5**: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
- **SL3.1B:** Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
- **SL3.1C:** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
- **SL3.1D:** Explain their own ideas and understanding in light of the discussion.
- **SL.3.6**: Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

NJSLS Anchor Standards & Indicators for Language

- **NJSLSA.L1**: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- **NJSLSA.L2**: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- **NJSLSA.L3**: Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
- **NJSLSA.L4**: Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
- **NJSLSA.L6**: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.
- **L3.2.G:** Consult reference materials, including beginning dictionaries, as needed to check and correct spellings.
- **L.3.3**: Use knowledge of language and its conventions when writing, speaking, reading, or listening.
  A. Choose words and phrases for effect.
- **L3.4.A:** Use sentence-level context as a clue to the meaning of a word or phrase.

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- **L3.4.D:** Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases.

Stage 2: Assessment Evidence

Performance Task(s):	Other Evidence:
• Creation of Lego model. • Completing a given task.	• Weekly STEAM reflection log (exit ticket) • Rubric • Classroom discussions/participation

Stage 3: Learning Plan

Learning Opportunities/Strategies:	
• Week 1	• Video at www.Legoeducation.com • Lego Education BricQ Motion Essential Set • Building instructions book • Chromebooks • Procedure Slide Show • STEAM logs/rubric (exit ticket
• Week 2	• Video at www.Legoeducation.com • Lego Education BricQ Motion Essential Set • Building instructions book • Chromebooks • STEAM logs/rubric (exit ticket) • Yardstick • Student worksheet
• Week 3	• Lego Education BricQ Motion Essential Sets • Building instructions, Book A • Chromebooks • STEAM logs/rubric (exit ticket)
• Week 4	• Lego Education BricQ Motion Essential Sets • Building instructions, Book A • Chromebooks • STEAM logs/rubric (exit ticket)
• Week 5	• https://www.google.com/search?q=stop+motion+on+chromebook&rlz=1C1CHBF_enUS913US913&oq=stop+motion+on+chrom&aqs=chrome.0.0i512j69i57j0i22i30l4j0i10i22i30j0i390l3.2798j0j7&sourceid=chrome&ie=UTF-8&safe=active&ssui=on#kpvalbx=_SAwEYczrKoOQ_QaH1YqQCw19 (Stop Motion How to) • Stop Motion Slide Show • Examples of Stop Motion videos https://www.digitalwish.com/dw/digitalwish/view_lesson_plans?id=6404 • Tinkercad

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• Week 6 • Week 7	• How to use the chromebook camera instructional video • Stop motion animation app from chrome store • Chromebook • Steam log • Props for stop motion • Green tri fold boards • Art supplies for backdrop • Tinkercad • Use BriQ creation for Stop Motion Animation Video • Video presentations • Lego Kits • Chromebook • Steam Log (exit ticket)

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
STEAM Reflection Log Extension Tasks 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	STEAM Reflection Log Varying instructional strategies In-class interventions Compacting activity Extend or abbreviate duration of assignments	STEAM Reflection Log **Materials** Provide text in alternative formats, such as Braille, 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 **Environment** Reduce visual or auditory distractions Preferential seating	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

		Post a visual schedule Emphasize multi-sensory learning **Directions** Use oral, recorded, and/or printed directions Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions Scaffolded Instruction **Time** Alert students before transitions Provide additional time for tasks Extra response time	

Unit Title: Unit 4: Structures and Simple Machines

Stage 1: Desired Results

Standards & Indicators:

NJSLS Mathematics

- **MP.2**: Reason abstractly and quantitatively.
- **MP.4**: Model with mathematics.
- **MP.5**: Use appropriate tools strategically.

NJSLS Science

- **3-5-ETS1-1**: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2**: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

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- **3-5-ETS1-3**: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

NJSLS Computer Science and Design Thinking

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

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
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 (CR1a).	Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
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.	
9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.

Central Idea/Enduring Understanding:

- STEAM is a combination of science, technology, engineering, art and mathematics used to solve real world problems with hands-on collaborative learning.
- Simple machines are tools that make work easier. Examples of tasks made easier include lifting a heavy weight, moving a heavy object over a distance, pushing things apart, changing the direction of a force, or holding an object together.
- Structures are designed to provide solutions to a human need. Engineers must understand Science, Technology, Engineering, and Mathematics (STEM) to create structures to meet code and safety specifications.

Essential/Guiding Question:

- What is engineering and why is it important?
- What do engineers do?
- What is a simple machine? How does it work? How are they used?
- How do simple machines combine to make work easier?
- What are structures and how are they designed/ made?

Content:

- Week 1 - Intro to Engineering. What is engineering?

Skills (Objectives):

- Define Engineering and how it applies to my life.
- Identify and explain knowledge of simple machines

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• Week 2 - Identify and differentiate the six types of simple machines: lever, screw, pulley, wheel and axle, inclined plane, and wedge. Differentiate and classify specific examples of simple machines found in school and household items. These include a screwdriver, nutcracker, screw, flagpole pulley, ramp, and seesaw. An example would be that an inclined plane is a ramp to make it easier for a heavy object to be moved up or down. Identify and classify the simple machines which compose a compound machine, such as scissors, wheelbarrow, and bicycle. • Week 3 - Explore materials for the structure and simple machine unit. Identify materials • Week 4 - Design and construct an apparatus that contains a simple machine • Week 5 - Build a given structure trials • Week 6 - Build a directed structure using simple machines within the structure. Video attempts and explanations identifying materials being used. • Week 7 - Presentation of video/discussion/reflection/assessment	• Classify simple machines in the world • Analyze and explain the function and application of the 6 types of simple machines. • Use materials provided to construct a structure using simple machines. • Demonstrate knowledge of materials being used to create a common structure and identify what simple machines make the structure functional.

Interdisciplinary Connections:

NJSLS English Language Arts

- **RI.5.1**: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- **RI.5.7**: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
- **RI.5.9**: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- **W.5.7**: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- **W.5.8**: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources.
- **W.5.9**: Draw evidence from literary or informational texts to support analysis, reflection, and research.

Stage 2: Assessment Evidence

Performance Task(s): • Presentation of completed structure build • Proper usage and identification of simple machines	**Other Evidence:** • Weekly STEAM reflection log (exit ticket) • Rubric • Classroom discussions/participation • Class activities showing knowledge of simple machines and structures (ie. online resources, google forms, etc.)

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Stage 3: Learning Plan

Learning Opportunities/Strategies:

- Week 1 - Intro to Engineering. What is engineering? What are the different types of engineering? What is the engineering design process?
- Week 2 - Identify and differentiate the six types of simple machines: lever, screw, pulley, wheel and axle, inclined plane, and wedge. Differentiate and classify specific examples of simple machines found in school and household items. These include a screwdriver, nutcracker, screw, flagpole pulley, ramp, and seesaw. An example would be that an inclined plane is a ramp to make it easier for a heavy object to be moved up or down. Identify and classify the simple machines which compose a compound machine, such as scissors, wheelbarrow, and bicycle.
- Week 3 - Explore materials for the structure and simple machine unit. Identify materials
- Week 4 - Design and construct an apparatus that contains a simple machine
- Week 5 - Build a given structure trials
- Week 6 - Build a directed structure using simple machines within the structure. Video attempts and explanations identifying materials being used.
- Week 7 - Presentation of video/discussion/reflection/assessment

- Each class will follow this format:
  - Do Now activity
  - Direct instruction
  - Discussion/Model
  - Apply concepts
  - Allow time for independent exploration

Resources:

- KWL Chart on engineering
- Introductory video on engineering from Crash Course Kids
- Mentor text: SAMPLES: Rosie Revere, Engineer Engineering, The Most Magnificent Thing" Engineering Design Process, Engineering in our Everyday Lives (on EPIC), Dream Jobs in Engineering (on EPIC)
- https://www.teachengineering.org/content/umo_/lessons/umo_challenges/umo_challenges_lesson01_presentation_v2_tedl_dwc.pdf
- Simple Machines for Kids | Learn all about the 6 simple machines! Video by Clarendon Learning
- Brainpop Simple Machines
- Google forms identifying simple machines
- Keva Maker Bot Maze
- Chain Reaction Kits
- Structure and simple machines building materials
- Chromebooks
- Presentation video
- STEAM logs/rubric (exit ticket)
- Guest presenters: when available/if applicable

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High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
STEAM Reflection Log Extension Tasks Adaptation of materials and requirements	STEAM Reflection Log Varying instructional strategies In-class interventions	STEAM Reflection Log **Materials** Provide text in alternative formats,	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to:

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Elevated text or question complexity Independent student options Projects completed individually or with partners Self-selection of research Open-ended activities Expert mentorship	Compacting activity Extend or abbreviate duration of assignments	such as Braille, 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 **<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 Highlight key words in directions Give brief and concrete directions Have student verbalize steps Repeat, clarify, or reword directions Scaffolded Instruction	breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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		<u>Time</u> Alert students before transitions Provide additional time for tasks Extra response time	

Pacing Guide

Course Name	Resource	Standards
MP1		
UNIT 1 Coding ● 8 lessons	● KWL chart about the term technology ● articles/books/videos about technology ● Commonsensemedia.org lessons ● Chromebook shortcut poster ● Chromebook care video ● Code.org ● Learn how to use the video recording on the chromebook ● Coding programs ● Instructional supporting videos ● Complete task assigned with robot ● Rubric ● Make a video ● Chromebooks ● Present video ● STEAM logs/rubric (exit ticket) ● Guest presenters: when available/if applicable	● 9.4.5.CT.3, 9.4.5.CT.4, ● 9.4.5.DC.1, 9.4.5.DC.2, 9.4.5.DC.3, 9.4.5.DC.4, 9.4.5.DC.5, 9.4.5.DC.6, 9.4.5.DC.7, 9.4.5.DC.8 ● 9.4.5.IML.1 ● 9.4.5.TL.5
MP 2		
UNIT 2 Making Connections ● 8 lessons	● Chromebook ● STEAM Log ● Snap Circuits Green Alternative Energy Kit ● Mentor Text ● KWL Chart on energy	● ETS1.A, ETS1.B, EST1.C, ● 3.5.ETS1.2, 3.5.ETS.1.3, ● 8.2.5ED1., 8.2.5ED2, 8.2.5ED3, 8.2.5ED5, 8.2.5ED6 ● 8.2.5.ITH.4

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	• Scavenger Hunt Worksheet- https://docs.google.com/document/d/1zjbtN0CfCuRTaaMmPhyZy0Gj7DJzLm49W-sj-EUTb00/edit?usp=sharing • https://www.youtube.com/watch?v=HOFp8bHTN30 (What is a circuit?)	• 9.4.5.CI.3, • NJSLSA.SL1, NJSLSA.SL2, NJSLSA.SL5, SL.3.1 • NJSLSA.L1, NJSLSA.L2, NJSLSA.L4, NJSLSA.L6 • L.3.2, L.3.4, L.3.6
MP 3		
UNIT 3 Learning with Legos • 7 Lessons	• Video www.Legoeducation.com • Lego Education BricQ Motion Essential Set • Building instructions book • Chromebooks • STEAM logs/rubric (exit ticket) • Yardstick • Student worksheet • https://www.google.com/search?q=stop+motion+on+chromebook&rlz=1C1CHBF_enUS913US913&oq=stop+motion+on+chrom&aqs=chrome.0.0i512j69i57j0i22i30l4j0i10i22i30j0i390l3.2798j0j7&sourceid=chrome&ie=UTF-8&safe=active&ssui=on#kpvalbx=_SAwEYczrKoOQ_QaH1YqQCw19 (Stop Motion How to) • Stop Motion Slide Show • Examples of Stop Motion videos https://www.digitalwish.com/dw/digitalwish/view_lesson_plans?id=6404 • How to use the chromebook camera instructional video • Stop motion animation app from chrome store • Chromebook • Props for stop motion • Green tri fold boards • Art supplies for backdrop	• 8.1.5.NI.1:, • 8.1.5.DA.1, 8.1.5.DA.3,8.1.5.DA.5 . • 8.1.8.AP.6, 8.1.8.AP.8 • 3.MDA, 3.MDAB • 1.2.5.Cr1f:, 1.2.5.Cr2b:, 1.2.5.Cr2c:, 1.2.5.Cr3c: • 9.2.5CAP.3, 9.2.5CAP.4 • 9.4.5CI.4, • 9.4.5CT.4, • RI3.4, FR3.4.A, RF3.4.C • NJSLA.W1, NJSLA.W4, NJSLA.W6, NJSLA.W8, NJSLA.W9, NJSLA.W10 • NJSLSA.SL1, NJSLSA.SL2, NJSLSA.SL5 • SL3.1B, SL3.1C, SL3.1D SL3.6 • NJSLSA.L1, NJSLSA.L2, NJSLSA.L3, NJSLSA.L4, NJSLSA.L6 L3.2G, L3.3A, L3.4A, L3.4D
MP 4		

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UNIT 4 Structures & Simple Machines ● 7 lessons	● KWL Chart on engineering ● Introductory video on engineering from Crash Course Kids ● Mentor text: SAMPLES: Rosie Revere, Engineer Engineering, The Most Magnificent Thing" Engineering Design Process, Engineering in our Everyday Lives (on EPIC), Dream Jobs in Engineering (on EPIC) ● https://www.teachengineering.org/content/umo_/lessons/umo_challenges/umo_challenges_lesson01_presentation_v2_tedl_dwc.pdf ● Simple Machines for Kids | Learn all about the 6 simple machines! Video by Clarendon Learning ● Brainpop Simple Machines ● Google forms identifying simple machines	● MP.2, MP.4, MP.5 ● 3.5.OA ● 3.5.ETS1.1, 3.5.ETS1.2, 3.5.ETS1.3 ● 8.2.5.ED.1, 8.2.5.ED.2, 8.2.5.ED.3, 8.2.5.ED.5, 8.2.5.ED.6 ● 8.2.5.ITH.1, ● 9.4.5.CI.3, 9.4.5.CI.4, ● 9.4.5.CT.1 ● RI.5.1, RI.5.7, RI.5.9, ● W.5.7, W.5.8, W.5.9

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	● STEAM log ● Structure and simple machines building materials ● Chromebooks ● Presentation video ● STEAM logs/rubric (exit ticket) ● Guest presenters: when available/if applicable	