

## Innovation Lab Grade 4

**Unit Title:** Unit 1: Digging into STEAM

### Stage 1: Desired Results

**Standards & Indicators:**

**NJSLS Mathematics**

- **MP.1:** Make sense of problems and persevere in solving them.
- **MP.2:** Reason abstractly and quantitatively.
- **4.M.A.3:** Apply the area and perimeter formulas for rectangles in real world mathematical problems.

**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.

#### Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
<b>8.1.5.NI.2</b>	Describe physical and digital security measures for protecting sensitive personal information.	Distinguishing between public and private information is important for safe and secure online interactions.  Information can be protected using various security measures (i.e., physical and digital)
<b>8.1.5.IC.1</b>	Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes.	The development and modification of computing technology is driven by individual's needs and wants and can affect individuals differently.
<b>8.1.5.AP.1</b>	Compare and refine multiple algorithms for the same task and determine which is the most appropriate.	Different algorithms can achieve the same result.  Some algorithms are more

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		appropriate for a specific use than others.
<b>8.1.5.AP.2</b>	Create programs that use clearly named variables to store and modify data.	Programming languages provide variables, which are used to store and modify data.
<b>8.1.5.AP.3</b>	Create programs that include sequences, events, loops, and conditionals.	A variety of control structures are used to change the flow of program execution (e.g., sequences, events, loops, conditionals).
<b>8.1.5.AP.4</b>	Break down problems into smaller, manageable sub-problems to facilitate program development.	Programs can be broken down into smaller parts to facilitate their design, implementation, and review.
<b>8.1.5.AP.5</b>	Modify, remix, or incorporate pieces of existing programs into one's own work to add additional features or create a new program.	Programs can also be created by incorporating smaller portions of programs that already exist.
<b>8.1.5.AP.6</b>	Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended.	Individuals develop programs using an iterative process involving design, implementation, testing, and review.
<b>8.2.5.ED.4</b>	Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).	Engineering design requirements include desired features and limitations that need to be considered.

### Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
<b>9.2.5.CAP.3</b>	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.
<b>9.2.5.CAP.4</b>	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.	
<b>9.4.5.CI.4</b>	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.
<b>9.4.5.CT.3</b>	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.
<b>9.4.5.CT.4</b>	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.	
<b>9.4.5.DC.1</b>	Explain the need for and use of copyrights.	Intellectual property rights exist to protect the original works of individuals. It is allowable to use other people's ideas in one's own
<b>9.4.5.DC.2</b>	Provide attribution according to intellectual property rights guidelines using public domain or creative commons media.	

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<b>9.4.5.DC.3</b>	Distinguish between digital images that can be reused freely and those that have copyright restrictions.	work provided that proper credit is given to the original source.
<b>9.4.5.DC.4</b>	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.
<b>9.4.5.DC.5</b>	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.
<b>9.4.5.DC.6</b>	Compare and contrast how digital tools have changed social interactions.	Digital tools have positively and negatively changed the way people interact socially.
<b>9.4.5.DC.7</b>	Explain how posting and commenting in social spaces can have positive or negative consequences.	
<b>9.4.5.DC.8</b>	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.
<b>9.4.5.IML.1</b>	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.
<b>9.4.5.IML.4</b>	Determine the impact of implicit and explicit media messages on individuals, groups, and society as a whole.	Accurate and comprehensive information comes in a variety of platforms and formats and is the basis for effective decision-making.
<b>9.4.5.IML.5</b>	Distinguish how media are used by individuals, groups, and organizations for varying purposes.	
<b>9.4.5.IML.6</b>	Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions.	Specific situations require the use of relevant sources of information.
<b>9.4.5.IML.7</b>	Evaluate the degree to which information meets a need including social emotional learning, academic, and social.	
<b>9.4.5.TL.3</b>	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.
<b>9.4.5.TL.5</b>	Collaborate digitally to produce an artifact.	Collaborating digitally as a team can often develop a better artifact than an individual working alone.
<p><b>Central Idea/Enduring Understanding:</b></p> <ul style="list-style-type: none"> <li>STEAM is a combination of science, technology, engineering, arts, and mathematics used to solve real world</li> </ul>		<p><b>Essential/Guiding Question:</b></p> <ul style="list-style-type: none"> <li>What is STEAM and why is it important?</li> <li>What does it mean to be a responsible digital citizen?</li> </ul>

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<p>problems with hands-on collaborative learning.</p> <ul style="list-style-type: none"> <li>• A digital citizen is someone who uses the internet and other digital technology to responsibly participate within their community.</li> <li>• Protecting your information online is essential for your privacy now and into the future.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• What steps can be made to protect your information online?</li> <li>• What is coding and how does it impact my life?</li> </ul>
<p><b><u>Content:</u></b></p> <p>Week 1- Intro to STEAM (classroom procedures and creating a class rubric for self and teacher assessment)</p> <p>Week 2 - What does a STEAM class look like, how does it function, and what does the T mean in STEAM?</p> <p>Week 3 &amp; 4 - Digital citizenship/protecting your online identity and chromebook introduction/shortcuts/and care (commonsensemedia.org lessons)</p> <p>Week 5 - Code intro (what is coding, why is it important, how can I use it) – coding robot.</p> <p>Week 6 - Practice coding using coding software and given tasks</p> <p>Week 7 - Coding task trials and videoing of coding attempts with robot</p> <p>Week 8 - Coding presentation with robot/sharing of video/discussion/reflection/assessment</p>	<p><b><u>Skills (Objectives):</u></b></p> <ul style="list-style-type: none"> <li>• Define STEAM and how it can be useful in my life.</li> <li>• Define technology and research the history of technology.</li> <li>• Demonstrate knowledge of a STEAM classroom and how it functions (collaboration, location of materials, procedures)</li> <li>• Explain &amp; demonstrate ways to be a responsible digital citizen.</li> <li>• Define coding and how it is used in the real world.</li> <li>• Use code to program a robot to complete assigned tasks.</li> </ul>
<p><b><u>Interdisciplinary Connections:</u></b></p> <p>Interdisciplinary curriculum coordination will be done with other departments on a regular basis. The nature of the Innovation Lab (STEAM driven) discipline incorporates:</p> <ul style="list-style-type: none"> <li>• Real world, hands-on, collaborative learning experiences involving science, technology, engineering, arts, and mathematics (STEAM)</li> <li>• Basic principles of algebra, geometry, chemistry, electricity, and physics through real world learning experiences designed to develop critical thinking, collaborative and problem solving skills.</li> <li>• Opportunity to discover, create, and own solutions to real-world problems while using the latest technologies.</li> <li>• Leadership and problem solving skills through collaborations and presentations.</li> </ul> <p><b><u>NJSLS ELA Standards</u></b></p>	

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- **RI.CR.4.1.** Refer to details and examples as textual evidence when explaining what an informational text says explicitly and make relevant connections when drawing inferences from the text.
- **RI.MF.4.6.** Use evidence to show how graphics and visuals (e.g., illustrations, charts, graphs, diagrams, timelines, animations) support central ideas.
- **W.IW.4.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W.IW.4.2.D:** Use precise language and domain-specific vocabulary to inform about or explain the topic
- **W.WP.4.4:** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **W.RW.4.7:** Write routinely over extended time frames (with time for research and revision) and shorter time frames (a single sitting) for a range of tasks, purposes, and audiences
- **SL.PE.4.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.PE.4.1.B.** Follow agreed-upon rules for discussions and carry out assigned roles.
- **SL.PE.4.1.C.** Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- **SL.PE.4.1.D.** Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
- **L.WF.4.2** -Demonstrate command of the conventions of encoding and spelling.
- **L.WF.4.2.C.** -Spell grade-appropriate words correctly, consulting references as needed.
- **L.KL.4.1.** -Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- **L.KL.4.1.B.** -Choose words and phrases to convey ideas precisely.
- **L.VL.4.2.** -Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
- **L.VL.4.2.A.** -Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
- **L.VL.4.2.C.** -Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
- **L.KL.4.1.A.** -Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.

### Stage 2: Assessment Evidence

#### Performance Task(s):

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

#### Other Evidence:

- Completion of weekly exit tickets (STEAM LOG)
- 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?

#### Resources:

- Commonsensemedia.org
- procedure slide show
- Chromebooks
- STEAM logs/rubric (exit ticket)
- KWL chart about the term technology
- articles/books/videos about technology

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<p>Defining the history and present term of the word technology. Give examples of technology (pros and cons) and how we use it.</p> <ul style="list-style-type: none"><li>● Week 3 &amp; 4- Digital citizenship/online safety and chromebook introduction/shortcuts/and care</li><li>● Week 5 - Code intro and program tied to coding robot</li><li>● Week 6 - Practice coding using coding software</li><li>● Week 7 - Coding task trials and videoing trials</li><li>● Week 8 - Coding presentation/reflection/assessment</li></ul>	<ul style="list-style-type: none"><li>● Chromebooks</li><li>● STEAM logs/rubric (exit ticket)</li><li>● Commonsensemedia.org lessons</li><li>● Chromebook shortcut poster</li><li>● Chromebook care video</li><li>● Chromebooks</li><li>● STEAM logs/rubric (exit ticket)</li><li>● Google slides presentations on digital citizenship/safety</li><li>● Resources TBD</li><li>● Code.org</li><li>● Coding programs</li><li>● Instructional supporting videos</li><li>● Chromebooks</li><li>● STEAM logs/rubric (exit ticket)</li><li>● Learn how to use the video recording on the chromebook for video presentations</li><li>● Create a Maze</li><li>● Keva Bot Maze</li><li>● Resource TBD</li><li>● Code.org</li><li>● Coding programs</li><li>● Instructional supporting videos</li><li>● Chromebooks</li><li>● STEAM logs/rubric (exit ticket)</li><li>● Create a Maze</li><li>● Keva Bot Maze</li><li>● Resource TBD</li><li>● Complete task assigned with robot</li><li>● Rubric</li><li>● Make a video for presentation of coded robot using chromebook software</li><li>● Chromebooks</li><li>● STEAM logs/rubric (exit ticket)</li><li>● Create a Maze</li><li>● Keva Bot Maze</li><li>● Chromebooks</li><li>● Present video</li><li>● STEAM logs/rubric (exit ticket)</li></ul>
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<ul style="list-style-type: none"> <li>● Each class will follow this format:             <ul style="list-style-type: none"> <li>○ Do Now activity</li> <li>○ Direct instruction</li> <li>○ Discussion/Model</li> <li>○ Apply concepts</li> <li>○ Allow time for independent exploration</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Misc:</li> <li>● Guest presenters: when available/if applicable</li> </ul>		
<p><b>Differentiation</b> *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</p>			
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  <u><b>Materials</b></u> 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  <u><b>Environment</b></u> Reduce visual or auditory distractions Preferential seating  Post a visual schedule	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

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		<p>Emphasize multi-sensory learning</p> <p><b><u>Directions</u></b> Use oral, recorded, and/or printed directions</p> <p>Highlight key words in directions</p> <p>Give brief and concrete directions</p> <p>Have student verbalize steps</p> <p>Repeat, clarify, or reword directions</p> <p>Scaffolded Instruction</p> <p><b><u>Time</u></b> Alert students before transitions</p> <p>Provide additional time for tasks</p> <p>Extra response time</p>	
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**Unit Title:** Unit 2: Making Connections

### Stage 1: Desired Results

**Standards & Indicators:**

**NJSLS Mathematics**

- **MP.1:** Make sense of problems and persevere in solving them.
- **MP.2:** Reason abstractly and quantitatively.
- **4.M.A.3:** Apply the area and perimeter formulas for rectangles in real world mathematical problems.

**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

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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.

### Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
<b>8.2.5.ED.1</b>	Explain the functions of a system and its subsystems.	Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge.
<b>8.2.5.ED.2</b>	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.	
<b>8.2.5.ED.3</b>	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.	
<b>8.2.5.ED.5</b>	Describe how specifications and limitations impact the engineering design process.	Often, several design solutions exist, each better in some way than the others.  Engineering design requirements include desired features and limitations that need to be considered.
<b>8.2.5.ED.6</b>	Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.	
<b>8.2.5.ITH.2</b>	Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.	A new tool may have favorable or unfavorable results as well as both positive and negative effects on society.  Technology spurs new businesses and careers.
<b>8.2.5.ITH.3</b>	Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.	
<b>8.2.5.ITH.4</b>	Describe a technology/tool that has made the way people live easier or has led to a new business or career.	
<b>8.1.5.CS.1</b>	Model how computing devices connect to other components to form a system.	
<b>8.1.5.CS.2</b>	Model how computer software and hardware work together as a system to accomplish tasks.	Computing devices may be connected to other devices to form a system as a way to extend their capabilities.  Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information)

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<b>8.1.5.CS.3</b>	Identify potential solutions for simple hardware and software problems using common troubleshooting strategies.	Shared features allow for common troubleshooting strategies that can be effective for many systems.
<b>8.2.5.EC.1</b>	Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.	Technological choices and opportunities vary due to factors such as differences in economic resources, location, and cultural values.
<b>Career Readiness, Life Literacies and Key Skills</b>		
<b>Standard</b>	<b>Performance Expectations</b>	<b>Core Ideas</b>
<b>9.4.5.CI.3</b>	Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity.	Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills.
<p><b><u>Central Idea/Enduring Understanding:</u></b>            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.            A switch is a device for making and breaking the connection in an electric circuit.            Light energy is sound energy is a kind of kinetic energy with the ability to make types of light visible to human eyes.            Sound energy is the movement of energy through a substance – like air or water – and is caused by vibrations. Solids, liquids and gasses transmit sound as waves.</p>		<p><b><u>Essential/Guiding Question:</u></b></p> <ul style="list-style-type: none"> <li>● What is STEAM and why is it important?</li> <li>● What is electricity?</li> <li>● What makes a circuit work?</li> <li>● What is a switch?</li> <li>● What is the difference between an open and closed electric circuit?</li> <li>● What is the difference between a series and parallel circuit?</li> <li>● What is light and sound energy? How are they alike and different?</li> </ul>
<p><b><u>Content:</u></b>            Week 1 - Intro to electricity &amp; snap circuits             Week 2 - Types of circuits             Week 3- Explore Light and sound energy.             Week 4- Modeling of video recording             Week 5- Build a circuit             Week 6- Create your own circuit.             Week 7- Create your own circuit.             Week 8- Presentations</p>		<p><b><u>Skills (Objectives):</u></b></p> <ul style="list-style-type: none"> <li>● Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.</li> <li>● Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound.</li> <li>● Students will be able to describe how circuits works</li> <li>● Students will be able to follow directions to create different kinds of circuits.</li> <li>● Students will be able to design their own circuit.</li> <li>● Areas emphasized: building, testing, and troubleshooting circuits, and the basic physics of electricity.</li> </ul>

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### Interdisciplinary Connections:

#### NJSLS Anchor Standards & Indicators for Speaking and Listening

- **SL.PE.4.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.PE.4.1.B.** Follow agreed-upon rules for discussions and carry out assigned roles.
- **SL.PE.4.1.C.** Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- **SL.PE.4.1.D.** Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

#### NJSLS Anchor Standards & Indicators for Language

- **L.WF.4.2** -Demonstrate command of the conventions of encoding and spelling.
- **L.WF.4.2.C.** -Spell grade-appropriate words correctly, consulting references as needed.
- **L.VL.4.2.** -Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
- **L.VL.4.2.A.** -Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
- **L.VL.4.2.C.** -Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
- **L.KL.4.1.A.** -Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.

### 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 #'s TBD

#### Resources:

- Snap Circuit arcade
- Mentor Text
- Snap Circuit Slideshow
- <https://www.brainpop.com/science/energy/electricity/> (What is electricity?)
- KWL Chart on energy
- Chromebooks
- STEAM log/exit ticket
- <https://www.youtube.com/watch?v=HOFp8bHTN30> (What is a circuit?)
- Snap Circuits arcade Kit

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<p>Week 3- Explore Light and sound energy and how they move.</p> <p>Week 4- Intro to procedure and modeling videoing for circuit project build. Practice using chromebook to record, project #TBD</p> <p>Week 5- Complete project #'s TBD and practice recording giving objective and explanation.</p> <p>Week 6- Create your own circuit. Identify type of circuit. Record the path the electricity flows through using a chromebook camera.</p> <p>Week 7- Create your own circuit. Identify type of circuit. Record the path the electricity flows through using a chromebook camera.</p> <p>Week 8- Presentation of video/discussion/reflection/assessment</p>	<ul style="list-style-type: none"> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li>   <li>● Instructional videos on electricity/alternative energy (Renewable Energy 101   National Geographic - <a href="https://www.youtube.com/watch?v=1kUE0BZtTRc">https://www.youtube.com/watch?v=1kUE0BZtTRc</a>)</li> <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li> <li>● What is light energy? - <a href="https://youtu.be/LCEqlvHFihM">https://youtu.be/LCEqlvHFihM</a></li> <li>● What is sound? - <a href="https://youtu.be/3-xKZKxXuu0">https://youtu.be/3-xKZKxXuu0</a></li>   <li>● <a href="https://prezi.com/0gdnoq6vun9s/snap-circuits-presentation/">https://prezi.com/0gdnoq6vun9s/snap-circuits-presentation/</a></li> <li>● <a href="https://www.youtube.com/watch?v=jYeV90caWCI">https://www.youtube.com/watch?v=jYeV90caWCI</a> (How to make a video on chromebook and upload to google classroom)</li> <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li>   <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li>   <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li> <li>● Mentor Text</li>   <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li>   <li>● Snap Circuit arcade Kit</li> <li>● Chromebooks</li> <li>● STEAM log/exit ticket</li> </ul>
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**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	STEAM Reflection Log  Varying instructional strategies	STEAM Reflection Log  <b><u>Materials</u></b>	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:

## Innovation Lab Grade 4

<p>Adaptation of materials and requirements</p> <p>Elevated text or question complexity</p> <p>Independent student options</p> <p>Projects completed individually or with partners</p> <p>Self-selection of research</p> <p>Open-ended activities</p> <p>Expert mentorship</p>	<p>In-class interventions</p> <p>Compacting activity</p> <p>Extend or abbreviate duration of assignments</p>	<p>Provide text in alternative formats, such as Braille, large print, audio formats, or digital text</p> <p>Use peer readers</p> <p>Permit highlighting of text</p> <p>List discussion questions prior to reading text</p> <p>Vocabulary lists and/or study guides</p> <p>Provide lecture notes/outline</p> <p><b><u>Environment</u></b>          Reduce visual or auditory distractions          Preferential seating</p> <p>Post a visual schedule</p> <p>Emphasize multi-sensory learning</p> <p><b><u>Directions</u></b>          Use oral, recorded, and/or printed directions</p> <p>Highlight key words in directions</p> <p>Give brief and concrete directions</p> <p>Have student verbalize steps</p>	<p>breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing</p> <p>ELL supports should include, but are not limited to, the following::</p> <p>Extended time</p> <p>Provide visual aids</p> <p>Repeated directions</p> <p>Differentiate based on proficiency</p> <p>Provide word banks</p> <p>Allow for translators, dictionaries</p>
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## Innovation Lab Grade 4

		<p>Repeat, clarify, or reword directions</p> <p>Scaffolded Instruction</p> <p><b><u>Time</u></b> Alert students before transitions</p> <p>Provide additional time for tasks</p> <p>Extra response time</p>	
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**Unit Title:** Unit 3: Learning with Legos

### Stage 1: Desired Results

**Standards & Indicators:**

**NJSLS Mathematics**

- MP 1. Make sense of problems and persevere in solving them.
- MP 2. Reason abstractly and quantitatively.

**NJSLS Science**

- 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.

**NJSLS Anchor Standards 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.
- SL.PE.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- SL.PE.4.1.B. Follow agreed-upon rules for discussions and carry out assigned roles.
- SL.PE.4.1.C. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- SL.PE.4.1.D. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

**NJSLS Art Anchor Standard 1: Generating and conceptualizing ideas**

- 1.2.5.Cr1f: Brainstorm goals and plans for a media art audience.

**NJSLS Art Anchor Standard 2: Organizing and developing ideas**

## Innovation Lab Grade 4

- **1.2.5.Cr2b:** Model ideas, plan in an effective direction.
- **1.2.5.Cr2c:** Brainstorm goals and plans for a media art audience.

### NJSLS Art Anchor Standard 3: Refining and completing products

- **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.

### **Computer Science and Design Thinking**

<b>Standard</b>	<b>Performance Expectations</b>	<b>Core Ideas</b>
<b>8.1.5.NI.1</b>	Develop models that successfully transmit and receive information using both wired and wireless methods.	Information needs a physical or wireless path to travel to be sent and received.
<b>8.1.5.DA.1</b>	Collect, organize, and display data in order to highlight relationships or support a claim.	Data can be organized, displayed, and presented to highlight relationships.
<b>8.1.5.DA.3</b>	Organize and present collected data visually to communicate insights gained from different views of the data.	Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
<b>8.1.5.DA.5</b>	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.	Many factors influence the accuracy of inferences and predictions.

### **Career Readiness, Life Literacies and Key Skills**

<b>Standard</b>	<b>Performance Expectations</b>	<b>Core Ideas</b>
<b>9.2.5.CAP.3</b>	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.
<b>9.2.5.CAP.4</b>	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.	
<b>9.4.5.CI.4</b>	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.
<b>9.4.5.CT.4</b>	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.

#### **Essential/Guiding Question:**

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

## Innovation Lab Grade 4

<ul style="list-style-type: none"> <li>● Investigate the effects of balanced and unbalanced forces using Legos.</li> </ul>	
<p><b><u>Content:</u></b>            Week 1- Lego Learning and Exploration            Week 2 - Race Car            Week 3 - Free Throw            Week 4 - Bobsled            Week 5 -Stop Motion Introduction            Week 6 - Stop Motion Recording            Week 7 - Presentation/reflection/assessment</p>	<p><b><u>Skills (Objectives):</u></b></p> <ul style="list-style-type: none"> <li>● Explore how pushing and pulling affects a mechanism’s motion and speed.</li> <li>● Make predictions about how the forces acting on an object can change its motion.</li> <li>● Study and apply the process of stop-animation.</li> </ul>
<p><b><u>Interdisciplinary Connections:</u></b>  <b><u>NJSLS Anchor Standards &amp; Indicators for Reading</u></b></p> <ul style="list-style-type: none"> <li>● <b>NJSLSA.R4.</b> Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</li> <li>● <b>NJSLSA.R7.</b> Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.</li> <li>● <b>NJSLSA.R8.</b> Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.</li> <li>● <b>NJSLSA.R10.</b> Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.</li> <li>● <b>RI.CR.4.1.</b> Refer to details and examples as textual evidence when explaining what an informational text says explicitly and make relevant connections when drawing inferences from the text.</li> <li>● <b>RI.MF.4.6.</b> Use evidence to show how graphics and visuals (e.g., illustrations, charts, graphs, diagrams, timelines, animations) support central ideas.</li> </ul> <p><b><u>NJSLS Anchor Standards for Writing</u></b></p> <ul style="list-style-type: none"> <li>● <b>NJSLSA.W1.</b> Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.</li> <li>● <b>NJSLSA.W4.</b> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</li> <li>● <b>NJSLSA.W6.</b> Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.</li> <li>● <b>NJSLSA.W8.</b> Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.</li> <li>● <b>NJSLSA.W9.</b> Draw evidence from literary or informational texts to support analysis, reflection, and research.</li> <li>● <b>NJSLSA.W10.</b> 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.</li> <li>● <b>W.IW.4.2:</b> Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</li> <li>● <b>W.IW.4.2.D:</b> Use precise language and domain-specific vocabulary to inform about or explain the topic</li> <li>● <b>W.WP.4.4:</b> With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.</li> <li>● <b>W.RW.4.7:</b> Write routinely over extended time frames (with time for research and revision) and shorter time frames (a single sitting) for a range of tasks, purposes, and audiences</li> </ul> <p><b><u>NJSLS Anchor Standards for Speaking and Listening</u></b></p>	

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- **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.
- **SL.PE.4.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.PE.4.1.B.** Follow agreed-upon rules for discussions and carry out assigned roles.
- **SL.PE.4.1.C.** Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- **SL.PE.4.1.D.** Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

### **NJSLS Anchor Standards 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.
- **L.WF.4.2** -Demonstrate command of the conventions of encoding and spelling.
- **L.WF.4.2.C.** -Spell grade-appropriate words correctly, consulting references as needed.
- **L.KL.4.1.** -Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- **L.KL.4.1.B.** -Choose words and phrases to convey ideas precisely.
- **L.VL.4.2.** -Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
- **L.VL.4.2.A.** -Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
- **L.VL.4.2.C.** -Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
- **L.KL.4.1.A.** -Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.

### **Stage 2: Assessment Evidence**

#### **Performance Task(s):**

- Creation of Lego model.
- Completing a given task.

#### **Other Evidence:**

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

## Innovation Lab Grade 4

### Stage 3: Learning Plan

#### Learning Opportunities/Strategies:

- Week 1: Lego learning and exploration
  
- Week 2-Race Car
  
- Week 3:Free Throw
  
- Week 4-Bobsled
  
- Week 5-Stop Motion Introduction
  
- Week 6 -Stop Motion Recording

#### Resources:

- Video at [www.Legoeducation.com](http://www.Legoeducation.com)
- Lego Education BricQ Motion Essential Set
- Building instructions book
- Chromebooks
- Procedure Slide Show
- STEAM logs/rubric (exit ticket)
  
- Video at [www.Legoeducation.com](http://www.Legoeducation.com)
- Lego Education BricQ Motion Essential Set
- Building instructions book
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Yardstick
- Student worksheet
  
- Video at [www.Legoeducation.com](http://www.Legoeducation.com)
- Lego Education BricQ Motion Essential Set
- Building instructions book
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Student worksheet
  
- Video at [www.Legoeducation.com](http://www.Legoeducation.com)
- Lego Education BricQ Motion Essential Set
- Building instructions book
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Yardstick
- Masking Tape
- Student worksheet
  
- Video at [www.Legoeducation.com](http://www.Legoeducation.com)
- Lego Education BricQ Motion Essential Set
- Building instructions book
- Chromebooks
- STEAM logs/rubric (exit ticket)
- Student worksheet
- TinkerCad to create main character
- Use Lego Briq Essentials creation for stop motion animation video
  
- [https://www.google.com/search?q=stop+motion+on+chromebook&rlz=1C1CHBF\\_enUS913US913&oq=stop+motion+on+chrom&aqs=chrome.0.0i512j69i57j0i22i30l4j0i10i22i30j0i39013.2798j0j7&sourceid=chrome&ie](https://www.google.com/search?q=stop+motion+on+chromebook&rlz=1C1CHBF_enUS913US913&oq=stop+motion+on+chrom&aqs=chrome.0.0i512j69i57j0i22i30l4j0i10i22i30j0i39013.2798j0j7&sourceid=chrome&ie)

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<ul style="list-style-type: none"> <li>Week 7 - Presentation/reflection/assessment</li> </ul> <p>Each class will follow this format: Do now activity Direct Instruction Discussion/Model Apply Concepts Allow time for independent exploration</p>	<p><a href="#">=UTF-8&amp;safe=active&amp;ssui=on#kpvalbx=_SAwEYcziKoOO_QaH1YqQCw19</a> (Stop Motion How to)</p> <ul style="list-style-type: none"> <li>Stop Motion Slide Show</li> <li>Examples of Stop Motion videos <a href="https://www.digitalwish.com/dw/digitalwish/view_less_on_plans?id=6404">https://www.digitalwish.com/dw/digitalwish/view_less_on_plans?id=6404</a></li> <li>How to use the chromebook camera instructional video</li> <li>Stop motion animation app from chrome store</li> <li>Chromebook</li> <li>Steam log</li> <li>Props for stop motion</li> <li>Green tri fold boards</li> <li>Art supplies for backdrop</li> <li>TinkerCad</li> <li>TinkerCad to create main character</li> <li>Use Lego Briq Essentials creation for stop motion animation video</li> </ul> <ul style="list-style-type: none"> <li>Video presentations</li> <li>Lego Kits</li> <li>Chromebook</li> <li>Steam Log (exit ticket)</li> </ul>		
<p><b>Differentiation</b> *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</p>			
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	STEAM Reflection Log  Varying instructional strategies  In-class interventions  Compacting activity  Extend or abbreviate duration of assignments	STEAM Reflection Log  <u><b>Materials</b></u> 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  ELL supports should include, but are not limited to, the following: Extended time Provide visual aids Repeated directions

## Innovation Lab Grade 4

<p>Self-selection of research</p> <p>Open-ended activities</p> <p>Expert mentorship</p>		<p>List discussion questions prior to reading text</p> <p>Vocabulary lists and/or study guides</p> <p>Provide lecture notes/outline</p> <p><b><u>Environment</u></b>          Reduce visual or auditory distractions          Preferential seating</p> <p>Post a visual schedule</p> <p>Emphasize multi-sensory learning</p> <p><b><u>Directions</u></b>          Use oral, recorded, and/or printed directions</p> <p>Highlight key words in directions</p> <p>Give brief and concrete directions</p> <p>Have student verbalize steps</p> <p>Repeat, clarify, or reword directions</p> <p>Scaffolded Instruction</p> <p><b><u>Time</u></b>          Alert students before transitions</p> <p>Provide additional time for tasks</p>	<p>Differentiate based on proficiency</p> <p>Provide word banks</p> <p>Allow for translators, dictionaries</p>
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## Innovation Lab Grade 4

		Extra response time	
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**Unit Title:** Unit 4: Structures & Simple Machines

### Stage 1: Desired Results

**Standards & Indicators:**

**NJSLS - Mathematics**

- **MP 1.** Make sense of problems and persevere in solving them.
- **MP 2.** Reason abstractly and quantitatively.

**NJSLS - Science**

- **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.

### Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
<b>8.1.5.NI.1</b>	Develop models that successfully transmit and receive information using both wired and wireless methods.	Information needs a physical or wireless path to travel to be sent and received.
<b>8.1.5.DA.1</b>	Collect, organize, and display data in order to highlight relationships or support a claim.	Data can be organized, displayed, and presented to highlight relationships.
<b>8.1.5.DA.3</b>	Organize and present collected data visually to communicate insights gained from different views of the data.	Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.
<b>8.1.5.DA.5</b>	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.	Many factors influence the accuracy of inferences and predictions.
<b>8.1.8.AP.6</b>	Refine a solution that meets users' needs by incorporating feedback from team members and users.	Individuals design and test solutions to identify problems taking into consideration the diverse needs of the users and the community.
<b>8.1.8.AP.8</b>	Systematically test and refine programs using a range of test cases and users.	
<b>8.2.5.NT.1</b>	Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem.	Technology innovation and improvement may be influenced by a variety of factors.  Engineers create and modify technologies to meet people's needs and wants; scientists ask questions about the natural world.
<b>8.2.5.NT.2</b>	Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies.	
<b>8.2.5.NT.3</b>	Redesign an existing product for a different purpose in a collaborative team.	
<b>8.2.5.NT.4</b>	Identify how improvement in the understanding of materials science impacts technologies..	

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<b>Career Readiness, Life Literacies and Key Skills</b>		
<b>Standard</b>	<b>Performance Expectations</b>	<b>Core Ideas</b>
<b>9.2.5.CAP.3</b>	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.
<b>9.2.5.CAP.4</b>	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.	
<b>9.4.5.CI.4</b>	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.
<b>9.4.5.CT.3</b>	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.
<b>9.4.5.CT.4</b>	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global .	
<p><b><u>Central Idea/Enduring Understanding:</u></b></p> <ul style="list-style-type: none"> <li>● STEAM is a combination of science, technology, engineering, art and mathematics used to solve real world problems with hands-on collaborative learning.</li> <li>● 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.</li> <li>● 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.</li> </ul>		<p><b><u>Essential/Guiding Question:</u></b></p> <ul style="list-style-type: none"> <li>● What is engineering and why is it important?</li> <li>● What do engineers do?</li> <li>● What is a simple machine? How does it work? How are they used?</li> <li>● How do simple machines combine to make work easier?</li> <li>● What are structures and how are they designed/ made?</li> </ul>
<p><b><u>Content:</u></b></p> <ul style="list-style-type: none"> <li>● Week 1 - Intro to Engineering. What is engineering?</li> <li>● 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</li> </ul>		<p><b><u>Skills (Objectives):</u></b></p> <p>Define Engineering and how it applies to my life.</p> <ul style="list-style-type: none"> <li>● Identify and explain knowledge of simple machines</li> <li>● Classify simple machines in the world</li> <li>● Analyze and explain the function and application of the 6 types of simple machines.</li> <li>● Use materials provided to construct a structure using simple machines.</li> </ul>

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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

- Demonstrate knowledge of materials being used to create a common structure and identify what simple machines make the structure functional.

### Interdisciplinary Connections:

#### Anchor Standards & Indicators for Reading

- **NJSLSA.R4.** Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- **NJSLSA.R7.** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- **NJSLSA.R8.** Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
- **NJSLSA.R10.** Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
- **RI.CR.4.1.** Refer to details and examples as textual evidence when explaining what an informational text says explicitly and make relevant connections when drawing inferences from the text.
- **RI.MF.4.6.** Use evidence to show how graphics and visuals (e.g., illustrations, charts, graphs, diagrams, timelines, animations) support central ideas.

#### Anchor Standards 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 task, 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.

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- **W.IW4.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W.IW.4.2.D:** Use precise language and domain-specific vocabulary to inform about or explain the topic
- **W.WP.4.4:** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **W.RW.4.7:** Write routinely over extended time frames (with time for research and revision) and shorter time frames (a single sitting) for a range of tasks, purposes, and audiences

### **Anchor Standards 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.
- **SL.PE.4.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.PE.4.1.B.** Follow agreed-upon rules for discussions and carry out assigned roles.
- **SL.PE.4.1.C.** Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
- **SL.PE.4.1.D.** Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

### **Anchor Standards 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.
- **L.WF.4.2** -Demonstrate command of the conventions of encoding and spelling.
- **L.WF.4.2.C.** -Spell grade-appropriate words correctly, consulting references as needed.
- **L.KL.4.1.** -Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- **L.KL.4.1.B.** -Choose words and phrases to convey ideas precisely.
- **L.VL.4.2.** -Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
- **L.VL.4.2.A.** -Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
- **L.VL.4.2.C.** -Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.

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- L.KL.4.1.A. -Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.

### 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.)

### 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

#### 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\\_/lesson/s/umo\\_challenges/umo\\_challenges\\_lesson01\\_presentation\\_v2\\_tedl\\_dwc.pdf](https://www.teachengineering.org/content/umo_/lesson/s/umo_challenges/umo_challenges_lesson01_presentation_v2_tedl_dwc.pdf)
- Chromebooks
- Chain Reaction Kits
- Building Brick Challenge Kit
- Simple Machines for Kids | Learn all about the 6 simple machines! Video by Clarendon Learning
- Brainpop Simple Machines
- Chromebooks
- Google forms identifying simple machines
- STEAM log
- Structure and simple machines building materials
- STEAM log
- Chromebooks
- Present video

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<ul style="list-style-type: none"> <li>● Week 6 - Build a directed structure using simple machines within the structure. Video attempts and explanations identifying materials being used.</li> <li>● Week 7 - Presentation of video/discussion/reflection/assessment</li>   <li>● Each class will follow this format:             <ul style="list-style-type: none"> <li>○ Do Now activity</li> <li>○ Direct instruction</li> <li>○ Discussion/Model</li> <li>○ Apply concepts</li> <li>○ Allow time for independent exploration</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● STEAM logs/rubric (exit ticket)</li>   <li>● Misc:</li> <li>● Guest presenters: when available/if applicable</li> </ul>
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**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  <u><b>Materials</b></u> 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  <u><b>Environment</b></u> 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

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		<p>Post a visual schedule</p> <p>Emphasize multi-sensory learning</p> <p><b><u>Directions</u></b> Use oral, recorded, and/or printed directions</p> <p>Highlight key words in directions</p> <p>Give brief and concrete directions</p> <p>Have student verbalize steps</p> <p>Repeat, clarify, or reword directions</p> <p>Scaffolded Instruction</p> <p><b><u>Time</u></b> Alert students before transitions</p> <p>Provide additional time for tasks</p> <p>Extra response time</p>	
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## Innovation Lab Grade 4

### Pacing Guide

Course Name	Resource	Standards
MP 1 Digging Into Stem/ Coding		
UNIT 1 Digging into STEAM <ul style="list-style-type: none"> <li>● 8 lessons</li> </ul>	<ul style="list-style-type: none"> <li>● KWL chart about the term technology</li> <li>● Articles/books/videos about technology</li> <li>● Commonsensemedia.org lessons</li> <li>● Chromebook shortcut poster</li> <li>● Chromebook care video</li> <li>● Code.org</li> <li>● Learn how to use the video recording on the chromebook</li> <li>● Coding programs</li> <li>● Instructional supporting videos</li> <li>● Complete task assigned with robot</li> <li>● Rubric</li> <li>● Make a video</li> <li>● Chromebooks</li> <li>● Present video</li> <li>● STEAM logs/rubric (exit ticket)</li> <li>● Guest presenters: when available/if applicable</li> </ul>	<ul style="list-style-type: none"> <li>● 9.2.5.CAP.3, 9.2.5.CAP.4</li> <li>● 9.4.2.DC.2</li> <li>● 9.4.5.CI.4, 9.4.5.CT.3, 9.4.5.CT.4</li> <li>● 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,</li> <li>● 9.4.5.IML.1, 9.4.5.IML.4, 9.4.5.IML.5, 9.4.5.IML.6, 9.4.5.IML.7</li> <li>● 9.4.5.TL.5, 9.4.5.TL.3</li> <li>● NJLSA.R4., NJLSA.R7, NJLSA.R8, NJLSA.R.10,</li> <li>● RI.4.1, RI.4.4., RI.4.7,</li> <li>● NJLSA.W1, NJLSA.W.4, NJLSA.W6, NJLSA.W8, NJLSA.W9, NJLSA.W10, N.4.2.D, W.4.6</li> <li>● NJLSA.SL1, NJLSA.SL2, NJLSA.SL5, SL.4.1.B, SL.4.1.C, SL.4.1.D</li> <li>● NJLSA.L.1, NJLSA.L2, NJLSA.L3, NJLSA.L4, NJLSA.L6</li> <li>● L.4.2.D, L.4.3, L.4.4A&amp;C, L.4.6</li> <li>● 8.1.5.NI.2, 8.1.5.AP.1, 8.1.5.AP.3, 8.1.5.AP.4, 8.1.5.AP.5, 8.1.5.AP.6, 8.1.5.CS.1, 8.1.5.CS.2, 8.1.5.CS.3</li> <li>● 8.2.5.ED.4</li> </ul>
MP 2		
UNIT 2 Making Connections <ul style="list-style-type: none"> <li>● 8 Lessons</li> </ul>	<ul style="list-style-type: none"> <li>● What is light energy? - <a href="https://youtu.be/LCEqlvHFIhM">https://youtu.be/LCEqlvHFIhM</a></li> <li>● What is sound? - <a href="https://youtu.be/3-xKZKxXuuo">https://youtu.be/3-xKZKxXuuo</a></li> <li>● Circuit kits</li> <li>● Task cards</li> </ul>	<ul style="list-style-type: none"> <li>● 3-5-ETS1 Engineering Design</li> <li>● 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:</li> <li>● 8.2.5.ITH.2, 8.2.5.ITH.3, 8.2.5.ITH.4</li> <li>● 9.4.5.CI.3</li> </ul>

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	<ul style="list-style-type: none"> <li>● Rubric</li> <li>● Online STEAM Reflection Log</li> <li>● Presentation</li> </ul>	<ul style="list-style-type: none"> <li>● NJLSA.SL, NJLSA.SL2, NJLSA.SL5</li> <li>● SL.4.1, SL.4.6</li> </ul>
MP 3		
UNIT 3 Learning with Legos <ul style="list-style-type: none"> <li>● 7 lessons</li> </ul>	<ul style="list-style-type: none"> <li>● Video at <a href="http://www.Legoeducation.com">www.Legoeducation.com</a></li> <li>● Lego Education BricQ Motion Essential Set</li> <li>● Building instructions book</li> <li>● Chromebooks</li> <li>● Procedure Slide Show</li> <li>● STEAM logs/rubric (exit ticket)</li> <li>● Student worksheet</li> <li>● Masking tape</li> <li>● Yardstick</li> <li>● Unit Online Assessment:</li> <li>● Online STEAM Reflection Log (weekly)</li> <li>● Rubric (weekly)</li> <li>● Presentation (end of unit)</li> </ul>	<ul style="list-style-type: none"> <li>● 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 S</li> <li>● 9.2.5.CAP.3, 9.2.5.CAP.4</li> <li>● 9.4.5.CI.4, 9.4.5.CT.4</li> <li>● NJLSA.R4, NJLSA.R7, NJLSA.R8, NJLSA.R10</li> <li>● RI.4.1, RI.4.4, RI.4.7</li> <li>● NJLSA.W1, NJLSA.W4, NJLSA.W6, NJLSA.W8, NJLSA.W9, NJLSA.W10</li> <li>● W.4.2, W.4.6</li> <li>● NJLSA.SL1, NJLSA.SL2, NJLSA.SL5</li> <li>● SL.4., NJLSA.L6</li> <li>● L.4.2, L.4.3, L.4.4, L.4.6</li> <li>● 1.2.5.Cr1f, 1.2.5.Cr2b, 1.2.5.Cr2c, 1.2.5.Cr3c</li> </ul>
MP 4		
UNIT 4 Simple Machines & Structures <ul style="list-style-type: none"> <li>● 7 Lessons</li> </ul>	<ul style="list-style-type: none"> <li>● KWL chart about the term engineering</li> <li>● articles/books/videos about engineering</li> <li>● videos/books about simple machines and structures</li> <li>● Google slide presentations on engineering/simple machines/structures</li> <li>● Google form</li> <li>● STEAM Log</li> <li>● Simple Machines building resources</li> <li>● Structure building materials</li> <li>● Rubric</li> <li>● Chromebooks</li> <li>● Guest speakers when available</li> </ul>	<ul style="list-style-type: none"> <li>● 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</li> <li>● 8.2.5.NT.1, 8.2.5.NT.2, 8.2.5.NT.3, 8.2.5.NT.4</li> <li>● 9.2.5.CAP.3, 9.2.5.CAP.4, 9.4.5.CI.4, 9.4.5.CT.3, 9.4.5.CT.4</li> <li>● NJLSA.R4,NJLSA.R7, NJLSA.R8, NJLSA.R10,</li> <li>● RI.4.1, RI.4.4, RI.4.7</li> <li>● NJLSA.W1, NJLSA.W4, NJLSA.W6, NJLSA.W8, NJLSA.W9, NJLSA.W10</li> <li>● W.4.2, W.4.6.</li> <li>● NJLSA.SL1, NJLSA.SL2, NJLSA.SL5, SL.4.1</li> <li>● NJLSA.L1, NJLSA.L2., NJLSA.L3., NJLSA.L4 NJLSA.L6.</li> <li>● L.4.2., L.4.3., L.4.4., L.4.6</li> </ul>