Unit 10: STEAM DAY

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

Ask questions based on observations to find more information about the natural and/or designed world(s).

Practice 2. Developing and using models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Distinguish between a model and the actual object, process, and/or events the model represents.

Practice 3. Planning and carrying out investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.

Make predictions based on prior experiences.

Practice 4. Analyzing and interpreting data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.

Compare predictions (based on prior experiences) to what occurred (observable events).

Analyze data from tests of an object or tool to determine if it works as intended.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.

Generate and/or compare multiple solutions to a problem.

Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

Construct an argument with evidence to support a claim.

Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence.

Practice 8. Obtaining, evaluating, and communicating information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).

Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.

AAAA.K-12.1	Inquire, think critically, and gain knowledge.
AAAA.K-12.1.1	Skills
AAAA.K-12.1.1.2	Use prior and background knowledge as context for new learning.
AAAA.K-12.1.1.4	Find, evaluate, and select appropriate sources to answer questions.
AAAA.K-12.1.1.8	Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
AAAA.K-12.1.1.9	Collaborate with others to broaden and deepen understanding.
AAAA.K-12.1.2	Dispositions in Action
AAAA.K-12.1.2.1	Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts.
AAAA.K-12.1.2.2	Demonstrate confidence and self- direction by making independent choices in the selection of resources and information.
AAAA.K-12.1.2.3	Demonstrate creativity by using multiple resources and formats.
AAAA.K-12.1.3	Responsibilities
AAAA.K-12.1.3.2	Seek divergent perspectives during information gathering and assessment.
AAAA.K-12.1.3.4	Contribute to the exchange of ideas within the learning community.
AAAA.K-12.1.3.5	Use information technology responsibly.
AAAA.K-12.1.4	Self-Assessment Strategies
AAAA.K-12.1.4.1	Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary.
AAAA.K-12.1.4.2	Use interaction with and feedback from teachers and peers to guide own inquiry process.
AAAA.K-12.1.4.3	Monitor gathered information, and assess for gaps or weaknesses.
AAAA.K-12.1.4.4	Seek appropriate help when it is needed.
AAAA.K-12.2	Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.
AAAA.K-12.2.1	Skills
AAAA.K-12.2.1.1	Continue an inquiry- based research process by applying critical- thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
AAAA.K-12.2.1.2	Organize knowledge so that it is useful.
AAAA.K-12.2.1.3	Use strategies to draw conclusions from information and apply knowledge to curricular

	areas, real-world situations, and further investigations.
AAAA.K-12.2.1.5	Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems.
AAAA.K-12.2.2	Dispositions in Action
AAAA.K-12.2.2.1	Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn.
AAAA.K-12.2.2.2	Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
AAAA.K-12.2.3	Responsibilities
AAAA.K-12.2.3.1	Connect understanding to the real world.
AAAA.K-12.2.4	Self-Assessment Strategies
AAAA.K-12.2.4.2	Reflect on systematic process, and assess for completeness of investigation.
AAAA.K-12.2.4.3	Recognize new knowledge and understanding.
AAAA.K-12.2.4.4	Develop directions for future investigations.
AAAA.K-12.3	Share knowledge and participate ethically and productively as members of our democratic society.
AAAA.K-12.3.1	Skills
AAAA.K-12.3.1.1	Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
AAAA.K-12.3.1.2	Participate and collaborate as members of a social and intellectual network of learners.
AAAA.K-12.3.1.3	Use writing and speaking skills to communicate new understandings effectively.
AAAA.K-12.3.2	Dispositions in Action
AAAA.K-12.3.2.1	Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations.
AAAA.K-12.3.2.3	Demonstrate teamwork by working productively with others.
AAAA.K-12.3.3	Responsibilities
AAAA.K-12.3.3.1	Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community.
AAAA.K-12.3.3.2	Respect the differing interests and experiences of others, and seek a variety of viewpoints.
AAAA.K-12.3.4	Self-Assessment Strategies
AAAA.K-12.3.4.1	Assess the processes by which learning was achieved in order to revise strategies and learn more effectively in the future.
AAAA.K-12.3.4.2	Assess the quality and effectiveness of the learning product.
AAAA.K-12.3.4.3	Assess own ability to work with others in a group setting by evaluating varied roles, leadership, and demonstrations of respect for other viewpoints.
AAAA.K-12.4	Pursue personal and aesthetic growth.
AAAA.K-12.4.1	Skills
AAAA.K-12.4.1.1	Read, view, and listen for pleasure and personal growth.
AAAA.K-12.4.2	Dispositions in Action
AAAA.K-12.4.2.3	Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.

AAAA.K-12.4.3	Responsibilities
AAAA.K-12.4.3.1	Participate in the social exchange of ideas, both electronically and in person.
AAAA.K-12.4.3.3	Seek opportunities for pursuing personal and aesthetic growth.
AAAA.K-12.4.4	Self-Assessment Strategies
AAAA.K-12.4.4.2	Recognize the limits of own personal knowledge.
AAAA.K-12.4.4.3	Recognize how to focus efforts in personal learning.
AAAA.K-12.4.4.5	Develop personal criteria for gauging how effectively own ideas are expressed.
AAAA.K-12.4.4.6	Evaluate own ability to select resources that are engaging and appropriate for personal interests and needs.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.2.2	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.2.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
TECH.8.2.2.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.2.E.1	List and demonstrate the steps to an everyday task.
TECH.8.2.2.E.2	Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.
TECH.8.2.2.E.3	Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).
TECH.8.2.2.E.4	Debug an algorithm (i.e., correct an error).

TECH.8.2.2.E.5	Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

	Key Ideas and Details
LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.K-12.NJSLSA.R2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
	Craft and Structure
LA.K-12.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.
	Range of Reading and Level of Text Complexity
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.RI.K	Reading Informational Text
LA.RI.K.1	With prompting and support, ask and answer questions about key details in a text.
LA.RI.K.2	With prompting and support, identify the main topic and retell key details of a text.
LA.RI.K.4	With prompting and support, ask and answer questions about unknown words in a text.
LA.RI.K.10	Actively engage in group reading activities with purpose and understanding.
LA.RF.K	Reading Foundation Skills
	Print Concepts
LA.RF.K.1	Demonstrate understanding of the organization and basic features of print.
LA.RF.K.1.A	Follow words from left to right, top to bottom, and page by page.
LA.RF.K.1.B	Recognize that spoken words are represented in written language by specific sequences of letters.
LA.K-12.NJSLSA.SL	Speaking and Listening
LA.RF.K.1.C	Understand that words are separated by spaces in print.
LA.RF.K.1.D	Recognize and name all upper- and lowercase letters of the alphabet.
	Comprehension and Collaboration
LA.K-12.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.
	Phonological Awareness
LA.RF.K.2	Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
LA.K-12.NJSLSA.SL2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
LA.K-12.NJSLSA.SL3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
LA.RF.K.2.B	Count, pronounce, blend, and segment syllables in spoken words.

LA.RF.K.2.D	Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant, or CVC) words. (This does not include CVCs ending with /l/, /r/, or /x/.)
LA.K-12.NJSLSA.SL6	Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.
	Phonics and Word Recognition
LA.RF.K.3	Know and apply grade-level phonics and word analysis skills in decoding and encoding words.
LA.RF.K.3.A	Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing many of the most frequently used sounds of each consonant.
LA.K-12.NJSLSA.L	Language
LA.RF.K.3.B	Associate the long and short sounds with the common spellings (graphemes) for the five major vowels.
LA.RF.K.3.C	Read high-frequency and sight words with automaticity.
	Fluency
LA.RF.K.4	Read emergent text with one-to-one correspondence to develop fluency and comprehension skills.
LA.RF.K.4.B	Read grade level text for purpose and understanding.
LA.K-12.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.
LA.SL.K.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
LA.SL.K.1.A	Follow agreed-upon norms for discussions (e.g., listening to others with care and taking turns speaking about the topics and texts under discussion).
LA.SL.K.1.B	Continue a conversation through multiple exchanges.
LA.SL.K.2	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
LA.SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
LA.SL.K.6	Speak audibly and express thoughts, feelings, and ideas clearly.
LA.L.K.6	Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale
Unit Rationale The purpose of this unit… 21st-Century learners work collaboratively to solve challenges involving Science, Technology, Engineering, Art and Mathematics.

Meaning

Essential Questions

Essential Questions

In a world of constant change, what skills should we learn?

How can we demonstrate a grade-appropriate and sound understanding of concepts involving Science, the nature and operation of technology systems, Engineering, Art & Mathematics?

What problem-solving skills and strategies can we use to solve STEAM (Science, Technology, Engineering, Art & Mathematics), challenges?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

- A grade-appropriate and sound understanding of concepts involving Science, the nature and operation of technology systems, Engineering, Art & Mathematics is essential for the 21st-Century learner.
- A sound knowledge of problem-solving strategies is essential to solve challenges involving Science, Technology, Engineering, Art & Mathematics.
- The 21st-Century learner applies current knowledge to solving challenges involving Science, Technology, Engineering, Art & Mathematics.
- The 21st-Century learner has the ability to work collaboratively with classmates.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- The Engineering Process: Ask, Imagine, Plan, Create, Improve
- Students will demonstrate collaboration skills, critical thinking skills and effective communication skills to promote successful group problem-solving.

Skills

Skills

Student will be skilled at …

- creating a process to solve challenges involving STEAM (Science, Technology, Engineering & Mathematics).

- Groups will using the engineering process: - Ask - What is the problem? How have others approached it? What are your constraints? - Imagine - What are some solutions? Brainstorm ideas. Choose the best one. - Plan - What will you do to solve the problem? What materials do you need? What steps will you take? - Create -Follow your plan and create something . Test it out. - Improve -What works? What doesn't? What could work better? Modify your design to make it better. Test it out.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- Web browser (e.g. Google Chrome)

Garfield STEAM Day
Newbie STEAM Day Challenges
Sharp STEAM Day
Tatem STEAM Day
Zane North STEAM Day

Formative Assessment Strategies

Formative Assessment Strategies

Observation

Student Conference

Misconception Check

Think-Pair-Share

Oral Questioning

Learning Activities/Unit of Study

Learning Activities/Unit of Study

"STEAM" problem challenges

- Students will work collaboratively to solve challenges using Science, Technology, Engineering, Art &

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students

at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.