Unit 08: 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.

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

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…

Students will be able to use their learning to collaboratively solve challenges involving Science, Technology, Engineering, Art and Mathematics.

Meaning

Essential Questions

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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

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- Students will demonstrate a grade-appropriate and sound understanding of concepts involving Science, the nature and operation of technology systems, Engineering, Art & Mathematics.
- Students will demonstrate problem-solving strategies to solve challenges involving Science, Technology, Engineering, Art & Mathematics.
- Students will apply current knowledge to solving challenges involving Science, Technology, Engineering, Art & Mathematics.
- Students will demonstrate 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 & Mathematics using the Engineering Process (Ask, Imagine, Plan, Create, Improve, Ask)

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.