



Grade 3 STEAM Unit 2 - Innovators in Action!

Unit Focus

In this exciting STEAM unit, students become young engineers, scientists, and computer scientists, tackling hands-on challenges that spark curiosity and creativity. Throughout the unit, students will explore how objects move, how forces interact, and how technology can help solve real-world problems.

Students will deepen their understanding of programming using Lego Education Science and Lego Education Spike by creating sequences and loops, breaking problems into smaller parts, and improving programs to meet specific needs. They will develop critical thinking skills as they test, debug, and refine their programs, learning to describe the decisions they've made and how their choices impact their solutions. Students will practice generating multiple solutions and iteratively improving their designs, building both technical skills and problem-solving confidence.

In the MakerSpace, students will apply scientific concepts to design devices that move objects, such as magnetic lifts and catapults. They will develop prototypes, test their designs, and make adjustments to improve function. By experimenting with forces, motion, and energy, students gain hands-on experience with the engineering design process while learning the importance of perseverance, collaboration, and creative thinking.

By the end of this unit, students will have strengthened their abilities to work collaboratively, think critically, and communicate their ideas effectively. They will have experienced the thrill of innovation firsthand—designing, testing, and refining solutions to real-world challenges—preparing them to be confident problem solvers and creative thinkers for years to come.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core English Language Arts: 3 - Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (CCSS.ELA-LITERACY.SL.3.4) Next Generation Science Standards Performance Expectations: 3 - Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (3-PS2-1) - Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. (3-PS2-2) - Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) - 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-ETS1-2)	<i>Students will be able to independently use their learning to...</i> T1 Ask questions to gain understanding, communicate their ideas, explain their thinking process, and evaluate efficiency or connectedness to a concept. T2 Work collaboratively and contribute constructively to project teams with a broader or global perspective. T3 Use the engineering design process to invent or innovate solutions. T4 Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems. T5 Leverage technology to demonstrate learning competencies.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Effective communicators ask questions, gather and analyze information, share ideas with reasons or evidence, explain their decisions and how they impact designs, and connect their results to real-world concepts.	<i>Students will keep considering...</i> Q1 How can I understand a problem, develop and test a design, and use strategies to solve challenges effectively? Q2 How do I clearly communicate my ideas, thought process, and/or results?

Stage 1: Desired Results - Key Understandings

- 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. (3-5-ETS1-3)

CSTA: Computer Science Standards (2017)

3-5

- Create programs that include sequences, events, loops, and conditionals. (1B-AP-10)
- Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. (1B-AP-11)
- Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features. (1B-AP-12)
- Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences. (1B-AP-13)
- Test and debug (identify and fix errors) a program or algorithm to ensure it runs as (1B-AP-15)
- Describe choices made during program development using code comments, presentations, and demonstrations. (1BAP-17)

ISTE Standards (2024)

ISTE Standards (2024): K-12

- Formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions. (1.5.a.)
- Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making. (1.5.b.)
- Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. (1.5.c.)
- Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions. (1.5.d.)

Madison Public Schools Profile of a Graduate

- Design: Engaging in a process to refine a product for an intended audience and purpose. (POG.2.2)
- Collective Intelligence: Working respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective. (POG.3.1)

U2 Problem solvers use strategies to understand tasks, try out solutions, evaluate results, consider feedback, and recognize that there can be multiple ways to solve a problem.

U3 Collaborative problem-solvers share ideas and respect the ideas of others.

U4 Effective problem solvers persevere by trying new ideas, gathering new information, or collaborating with others.

U5 Persevering through challenges builds one's growth mindset and builds resilience.

U6 Engineers utilize the engineering design process to solve problems and develop new ideas.

U7 Technological methods can be used to develop and test solutions.

Q3 How can group members work effectively together to contribute and achieve a common goal?

Q4 Why is it important to be able to persevere through challenges?

Q5 How does using technology help to accomplish a goal?

Acquisition of Knowledge and Skill

Knowledge

Students will know...

K1 Each subproblem can be tackled individually, then put together to solve the whole problem.

K2 Debugging is the process of finding and fixing mistakes or errors (bugs) in a program.

K3 Testing and improving are essential steps in the engineering design process.

K4 A problem can have more than one possible solution.

K5 Sequences are steps in a specific order that a program follows. Loops allow repeating actions multiple times without rewriting the same code.

K6 Algorithmic thinking means planning how to solve a problem using logical, ordered steps.

K7 Automation is having technology or machines do repetitive tasks.

K8 Motion can be affected by the strength and direction of force.

K9 Objects in motion often follow predictable patterns.

Skill(s)

Students will be skilled at...

S1 Decomposing problems into smaller parts.

S2 Identifying and fixing errors in a program (test and debug).

S3 Creating and testing automated solutions

S4 Testing and evaluating solutions to determine whether they meet a specific need or modifications/improvements are needed.

S5 Repeating testing with improved versions.

S6 Using sequences and loops to program their models.

S7 Using step by step strategies to plan a solution.

S8 Explaining how the parts of the system or problem interact.

S9 Developing a sequence of steps to create an automated solution.

S10 Planning and conducting an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.