



Grade 3 STEAM Unit 1 - Creative Builders-Solving Problems with Science and Engineering

Unit Focus

In this introductory STEAM unit, students will dive into hands-on challenges using LEGO Education Science kits and our MakerSpace. They will learn how to explore materials, design prototypes, and test their ideas while working together to solve a wide range of problems.

From designing homes that can withstand heavy rain, racing bug bots, and even creating tools to measure the wind, each activity gives students the chance to think like engineers and scientists. They will learn the expectations for communication, collaborate in teams, and practice giving and receiving feedback as they design, test, and improve their work.

As their introductory unit to STEAM, students will learn how to use materials appropriately to innovate their own designs for different challenges. They will construct prototypes for specific tasks, evaluate their effectiveness, and then refine their ideas by comparing them against criteria and constraints. This process helps students see the value of perseverance, creativity, and critical thinking. The unit concludes with time in the MakerSpace, where students will have greater autonomy to choose their designs, test materials, and make improvements based on results. These experiences immerse students in the design process and build their ability to problem-solve, innovate, and reflect—skills that will serve them well both in and beyond the classroom.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer			
Common Core English Language Arts: 2 Describe how characters in a story respond to major events and challenges. (CCSS.ELA.LITERACY.RL.2.3) Next Generation Science Standards Performance Expectations: 3 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. (3-ESS3-1) Science and Engineering Practices: 3 Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3) (3-5.ED.SEP.2.1) Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2) (3-5.ED.SEP.3.1) CSTA: Computer Science Standards (2017) K-2 Use appropriate terminology in identifying and describing the function of common physical components of computing systems (hardware). (1A-CS-02) ISTE Standards (2024)	<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.			
	Meaning			
	<table><tr><th>Understanding(s)</th><th>Essential Question(s)</th></tr><tr><td><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. U2 Problem solvers use strategies to understand tasks, try out solutions, evaluate</td><td><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? Q3 How can group members work effectively together to contribute and achieve a common goal?</td></tr></table>	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. U2 Problem solvers use strategies to understand tasks, try out solutions, evaluate
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Stage 1: Desired Results - Key Understandings

ISTE Standards (2024): K-12

- Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. (1.4.a.)
- Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks. (1.4.b.)
- Develop, test and refine prototypes as part of a cyclical design process. (1.4.c.)

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)

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.

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 Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

K2 Science affects everyone's daily life.

K3 The differences between hardware and software.

K4 The engineering and design process follows a series of steps to generate ideas, test theories, create artifacts, and solve problems.

K5 Design criteria are a set of requirements that guide the development of a solution.

K6 A design is considered successful when it matches design criteria / constraints and solves the posed problem.

K7 Design criteria can be used to compare and contrast different designs.

K8 Design choices can be directly related to the prototype's outcome.

Skill(s)

Students will be skilled at...

S1 Designing a solution to reduce the impacts of a weather-related hazard.

S2 Making a claim about the merit of design solutions that reduce the impact of weather-related hazards.

S3 Testing and modifying the prototypes.

S4 Developing, testing, and modifying a prototype using the engineering and design process.

S5 Comparing prototypes by referring back to design criteria and constraints.

S6 Managing a design process that considers design constraints and calculated risks.

S7 Controlling and testing variables to influence the engineering design process.

S8 Describing how characters in a story respond to major events and challenges.