Grade 2 STEAM Unit 3 - Building in Nature: Exploring Animal, Plant, and Environmental Science Through STEAM

Unit Focus

In this hands-on unit, students embark on an exciting journey to explore the natural world and apply scientific concepts through collaborative design and engineering challenges. Students start by working together to design solutions for science-related animal topics. They investigate the function of plant and animal behaviors, examine the diversity of life within habitats, and apply these observations to create their own models and solutions.

Next, students engage with Lego Education Spike and Lego Education Science that focus on a variety of scientific concepts, including animal and plant survival, seed dispersal, and wind erosion. Throughout these lessons, students practice the engineering design process: decomposing problems, redesigning solutions, and creating models that reflect what they have learned. They develop observational skills to select the best materials, refine prototypes, and design solutions that prevent or reduce wind damage. Students compare designs across the class, articulate their choices, and evaluate the effectiveness of different models.

Finally, students apply their science and engineering knowledge during MakerSpace activities, designing innovative solutions using the materials best suited for the task. This unit emphasizes the strong connection between science and engineering, helping students build confidence in using prior knowledge to generate ideas, persevere through challenges, and approach complex tasks independently. By the end of the unit, students become more skilled at tackling problems, testing solutions, and collaborating effectively with peers, all while deepening their understanding of the natural world.

Stage 1: Desired Results - Key Understandings

Standard(s)

Common Core

English Language Arts: 2

- Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. (CCSS.ELA-LITERACY.SL. 2.1)

Mathematics: 2

- Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers. (CCSS.MATH.CONTENT.2.OA.B.2)

Next Generation Science Standards

Performance Expectations: 2

- Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. (2-PS1-1)
- Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. (2-PS1-3)

Transfer

Students will be able to independently use their learning to...

T1 Ask questions to gain understanding, communicate their ideas, explain their thinking process, and evaluate efficiency or connectedness to a concept.
T2 Use the engineering design process to invent or innovate solutions.
T3 Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
T4 Work collaboratively and contribute constructively to project teams with a broader or global perspective.
T5 Leverage technology to demonstrate learning competencies.

Meaning

Understanding(s)

Students will understand that...

U1 Effective communicators support their ideas with reasoning or evidence, explain decisions, and relate results to real-world concepts.
U2 Collaborative problem solvers share ideas, respect contributions from others, and adjust their thinking based on input.

Essential Question(s)

Students will keep considering...

Q1 How do I develop and test a design, and how can technology help accomplish a goal?
Q2 Why is it important to persevere through challenges, and what makes an effective problem solver?

Stage 1: Desired Results - Key Understandings

- Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. (2-LS2-2)
- Make observations of plants and animals to compare the diversity of life in different habitats. (2-LS4-1)
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

CSTA: Computer Science Standards (2017)
K-2

- Develop programs with sequences and simple loops, to express ideas or address a problem. (1A-AP-10)

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)

U3 Persevering through challenges builds one's growth mindset and builds resilience.
U4 Engineers utilize the engineering design process to solve problems and develop new ideas.
U5 Technological methods can be used to develop and test solutions.
U6 Effective problem solvers use strategies to understand tasks, break them into smaller parts, and plan next steps.

Q3 How do effective group members contribute, work toward a common goal, and clearly communicate their ideas, thought process, and results?
Q4 How can I better understand a problem or task, and get started when it seems too big?

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
Students will know... **K1** There are many different kinds of living things in any area, and they exist in different places on land and in water. **K2** Plants depend on animals for pollination or to move their seeds around. **K3** A situation that people want to change or create can be approached as a problem to be solved through engineering. **K4** Asking questions, making observations, and gathering information are helpful in thinking about problems. **K5** Before beginning to design a solution, it is important to clearly understand the problem. **K6** A prototype is a first model of something that can be modified or replicated. **K7** An object made of a small set of pieces can be broken down and made into something new. **K8** Matter can be described and categorized based on its properties. **K9** Water and wind can change the shape of the land. **K10** Number sense within 20.	*Students will be skilled at...* **S1** Participating in collaborative conversations. **S2** Making observations of plants and animals to compare the diversity of life in different habitats. **S3** Developing a simple model that mimics the function of an animal in dispersing seeds or pollinating a plant. **S4** Developing programs with sequences and simple loops, to express ideas or address a problem. **S5** Building prototypes using the engineering and design process. **S6** Making observations and describing how an object can be broken down into pieces and made into something else. **S7** Planning and conducting an investigation to describe and classify different kinds of materials by their observable properties. **S8** Designing and comparing solutions for reducing wind's effect on the land. **S9** Efficiently solve within 20 using mental strategies.