Innovators in STEM
Grade 6
Unit 1 Plan

acher(s)	
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Unit Overview

Unit Title	A Place to Call Home
Unit Length	30 days; 15 periods; 42-minute periods
Performance Task	***A Place to Call Home*** Students survey the impact of human infrastructure and design on animal habitats and migration locally or around the world. Students utilize technology to survey the land, analyze the potential impacts on animals, and create wildlife corridors to provide a solution for how humans and animals can sustainably coexist, allowing for expansion and quality of life for all. ***Learning Process:*** *Problem-Based Learning*
Essential Questions	How can housing be designed to ensure a limited impact on the environment, affordability for all, and withstand natural phenomena?
Enduring Understandings	Housing of the future will need to have a low impact on the environment, withstand the elements, and be accessible and affordable for humans. Science and technology can help us create sustainable and affordable housing.
Pacing Guide	Link to unit pacing guide.

Goals

STEM Program Goals *By the end of the 6th grade…*		**Unit Goal** *By the end of this unit…*
Communication	Students will be able to **determine the mediums** best suited for communicating	Students will be able to utilize technology to communicate their

	their solutions and reaching an audience.	community design solutions.
Collaboration	Students will be able to **solicit and provide ideas and feedback** through brainstorming and problem-solving processes.	Students will use feedback to work through the brainstorming process without stifling ideas.
Creativity	Students will be able to **consider answers or solutions** that are **both unknown, or considered impossible** while **presenting information in concrete steps** to support others' understanding.	Students will be able to develop answers to inquiry questions that might be considered unknown or impossible.
Critical Thinking	Students will be able to **explain how ideas are logically connected**, and **supported by evidence**, to reach a conclusion and **ensure that others can understand** their analysis.	Students will be able to justify their community solutions with scientific information and theories.

Connections

Discipline	Connected Standards
Science (2020 NJSLS)	**Earth and Human Activity MS.ESS3.3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
	Engineering Design MS.ETS1.2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
	Ecosystems: Interactions, Energy, and Dynamics MS.LS2.5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Computer Science and Design Thinking (2020 NJSLS)	**Design Thinking 8.2.8.ED.3** Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
	Interaction of Technology and Humans 8.2.8.ITH.3 Evaluate the impact of sustainability on the development of a designed product or system.
English Language Arts (2020 NJSLSA)	**Writing Anchor W7** Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

	Speaking and Listening Anchor SL5 Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
	Language Anchor 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.
Technology (ISTE Standards for Students)	**Innovative Designer 1.4.b** Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
	Computational Thinker 1.5.a Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
UN Sustainable Development Goals	**Goal 11: Sustainable cities and communities** ● Make cities and human settlements inclusive, safe, resilient and sustainable.
	Goal 12: Responsible Consumption and Production ● Sustainable consumption and production patterns.
	Goal 13: Climate action ● Combat climate change and its impacts.

Learning Process and Check Points

Assessment Type	Learning Phase	Student Product	Description	Goal Assessed
Formative	Launch	A curated list of research articles. Screenshots, videos, or other evidence gathered through physical exploration of the community	Identify the impact of human infrastructure on the natural world through research and exploration of the community.	Creativity Collaboration
Formative	Inquiry	A curated list of research articles.	Research solutions that have been attempted in the past,	Creativity Collaboration

		Ideas proposed by group members.	inventions and innovations currently being researched, and propose new products and strategies to address the impacts identified.	
Formative	Planning	At least two sketches of their proposed community. A list of tools and software needed to construct their model.	Sketch multiple possibilities for the sustainable neighborhood inspired by research, incorporating different innovations in each one. For each sketch, show what the final product would look like and list the tools needed to transform that sketch into a detailed model.	Collaboration Communication
Formative	Create	A 3D model of a prototype solution.	Create a 3D model that incorporates the strongest ideas of the sketches and will serve as the prototype for a solution.	Collaboration Communication Critical Thinking
Summative	Present	A list of improvements that could be made to the prototype.	Share prototypes and solicit feedback from peers. Make note of potential improvements that could be made and the areas that seem like they would be the most successful.	All unit learning goals in communication, collaboration, creativity, and critical thinking.
Summative	Reflect	Unit reflection journal.	Reflect on the problem-based learning experience.	All unit learning goals in communication, collaboration, creativity, and critical thinking.

Unit Resources

Type	Purpose/Description	Access the Resource
Physical Building Materials	Materials for constructing a physical model	Gather craft and recyclable materials for

		building.
3D Modeling Software	Software for constructing a digital model of their proposed community.	*Recommendation:* CoSpaces
Optional: **Drones**	Drones for surveying their community	*Recommendation:* Robolink
UN Sustainable Development Goals	Students draw connections between their designs and real-world problems/goals	https://sdgs.un.org/goals
Optional: **Student Design Log**	Students record their learning and reflection as part of the design process	Create a digital or physical resource for students.

Vocabulary

Academic Vocabulary *(Tier 2 Words)*		**Subject-Specific Vocabulary *(Tier 3 Words)***	
• Built environment • Community • Housing • Infrastructure	• Initiative • Natural environment • Transportation • Zoning	• Biodiversity • Fauna • Flora • Migration	• Runoff • Wetlands • Wildlife corridor • Wildlife crossings

Differentiation

Type *The type of differentiation strategy.*	**Strategy** *The specific differentiation strategy.*	**Implementation** *When, how, or why the strategy is implemented.*
Modification *A change to the learning objective.*	Set individualized and relevant learning goals based on the performance task rubric.	For students who are working on developing their skills but below grade level expectations, use the performance task rubric to identify which criteria levels the students will meet (ie. some students will have a goal of achieving level 4 whereas others might have a goal of achieving level 2).
	Provide a specific resource to use.	Reduce the scope of research to ensure students connect with the information necessary to continue with the other components of the task.
Scaffold *A support to aid access, learning, and mastery of an*	Provide examples of human impact on the natural	Students research or explore educator curated examples. Supports students who benefit from

objective. May result in a change in the time, input, output, or size of learning experiences.	environment.	concrete examples.
	Provide a selection of resource sources to choose from.	Reduce the scope of research to ensure students connect with the information necessary to continue with the other components of the task.
	Group roles - some roles might include: *materials manager, researcher, quality assurer, project manager*	Utilize intentional group roles to support student collaboration.
	Provide a Problem-Based learning checklist.	Provide the steps of the Problem-Based learning process to remind students of the process and move autonomously through it.
	Technology tutorials.	Provide tutorials on the use of new technologies that students can revisit as needed to promote independence and deeper use of tools.
	Provide a presentation template.	Provide a template for sharing their sustainable community.
Enrichment *A way to provide students personalized, in depth learning.*	Student choice of topics.	Students can have as little as or as much choice in the topic of their solution. Some students benefit from a concrete list of structured choice whereas others may benefit from open ended choice and can work through the abstract.
	Additional Research Requirements	Place additional requirements on the research phase to increase the challenge level of the community design. Potential requirements may be connected to the use of drones for surveying, traffic patterns, or data collection (soil samples, weather data, water and air quality, and more).
Extension *A way of extending the learning of unit, objective, or lesson.*	Students enter their solutions into the New Jersey STEAM Tank competition.	Students, with the support of an educator, can enter their design solutions into the STEAM Tank competition to share publicly and iterate their ideas with the support of mentors from the field.

Unit Preparation

Technology Set Up	**1. Complete the next section, "Unit Considerations," and reflect on student strengths, areas of anticipated challenges, and appreciate differentiation strategies.** **2. Review the sample Pacing Guide and modify it to accommodate your learning schedule.** 3. Confirm that all devices are functional and any accounts or subscriptions required are set up. 4. Gather and organize construction materials.
Unit Considerations *Teacher Reflection*	*Think about students' current skills and knowledge, what they may struggle with, where differentiation might be appropriate, and how this unit can be customized for your classroom. Write your reflections below:*

Pacing Guide

The learning phases and project checkpoints are outlined below. Complete, revise, and/or expand upon the pacing guide for your classroom.

Day/Class Period	Phase	Aim / Activity *What is the learning objective? What will students do?*	Assessment *How will you assess learning?*
Day 1	Launch		
Day 2			
Day 3		Students will be able to conduct research on a topic with many facets to identify problems in need of innovative solutions.	Students will curate a list of research articles, screenshots, videos, or other evidence gathered through physical exploration of the community.
Day 4	Inquiry		
Day 5			
Day 6			
Day 7		Students will be able to further research based on previously gathered data.	Students will curate a list of research articles on past solutions and ideas proposed by group members.
Day 8			

Day 9	Planning	Students will be able to use research to collaborate in the development of a sustainable innovation.	Students will create at least two sketches of their proposed community and provide a list of tools and software needed to construct their model.
Day 10	Create		
Day 11			
Day 12		Students will be able to turn ideas and proposals into actionable models.	Students will create a 3D model of a prototype solution.
Day 13	Present		
Day 14		Students will be able to share ideas in creative and interesting ways while gathering feedback for iteration.	Students will create and share a presentation highlighting their proposed solutions, and make a list of improvements that could be made to the prototype.
Day 15	Reflect	Students will be able to reflect on the problem-based learning experience and the impact of humans on the natural world.	Students will write a journal reflection of their learning experience.