Innovators in STEM
Grade 6
Unit 2 Plan

acher(s)	
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Unit Overview

Unit Title	The Innovator's Exchange
Unit Length	30 days; 15 periods; 42-minute periods
Performance Task	***The Innovator's Exchange*** Students work together to design an application that aims to teach others on a topic of climate change and guide learning through a digital medium. The application will feature an interactive learning experience that guides people through three learning steps: Learn, Discuss, Try. Students will make decisions in the content, user experience, and user interface for their custom apps that best apply to the learning modalities and learning goals. ***Learning Process:*** *Problem-Based Learning*
Essential Questions	How can we make learning accessible to all and promote life-long learning to tackle poverty, inequality, and sustainability?
Enduring Understandings	Equitable and inclusive education can address issues of poverty, inequality, and sustainability.
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 create a tutorial using the appropriate medium for

	their solutions and reaching an audience.	teaching a skill or concept.
Collaboration	Students will be able to **solicit and provide ideas and feedback** through brainstorming and problem-solving processes.	Students will be able to provide feedback to peers on the efficacy of their tutorials.
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 convey complex concepts concretely in ways that develop others' understanding of the topic.
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 determine how to logically convey information and support their teachings with evidence.

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.
	Earth and Human Activity MS.ESS3.5 Ask questions to clarify evidence of the factors that have caused climate change over the past century.
	Engineering Design 3-5.ETS1.3 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.
Computer Science and Design Thinking (2020 NJSLS)	**Computing Systems 8.1.8.CS.1** Recommend improvements to computing devices in order to improve the ways users interact with the devices.
	Computing Systems 8.1.8.CS.3 Justify design decisions and explain potential system trade-offs.
	Engineering Design 8.2.8.ED.7 Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs

	(e.g., annotated sketches).
English Language Arts (2020 NJSLSA)	**Writing Anchor W6** Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
	Speaking and Listening Anchor SL6 Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.
	Language Anchor L3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
Technology (ISTE Standards for Students)	**1.3.b: Knowledge Constructor** Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
	1.6.b: Creative Communicator Students create original works or responsibly repurpose or remix digital resources into new creations.
	1.7.b: Global Collaborator Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
UN Sustainable Development Goals	**Goal 4: Quality Education** ● Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
	Goal 11: Sustainable cities and communities ● Make cities and human settlements inclusive, safe, resilient and sustainable.
	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	**Ask**	A list of “knows” and “must-knows.”	Identify a climate change issue, list what is already known, and what is needed to	Creativity Critical Thinking

			know in order to educate others.	
Formative	**Imagine**	Organized research with high-impact information highlighted.	Research the issue and fill in the knowledge gaps previously identified. Highlight high-impact statistics, misconceptions, and action paths that can educate users.	Creativity Critical Thinking
Formative	**Design**	Annotated sketches of the Learn, Discuss, and Try areas of the app. List of features that enhance interactivity and user engagement.	Sketch the design of an app, including representation of each of the three steps (Learn, Discuss, Try). Annotate sketches to explain high impact design choices and how the user will be engaged by the design.	Collaboration Communication
Formative	**Create**	A full-scale render of the app, showcasing as much of the UI/UX as possible.	Build the app, showcasing as much of the user interface and user experience as possible. Include the high-impact information identified in research.	Collaboration Communication
Summative	**Test**	Data analysis of peer feedback.	Test the app in a focus group of peers. Solicit their feedback on the visual design, content, and interactivity of the app. Measure how much they've learned as an additional metric to include in analysis. Analyze the feedback and identify areas of improvement in the next iteration.	All unit learning goals in communication, collaboration, creativity, and critical thinking.
Summative	**Reflect**	Unit reflection journal.	Reflect on your problem-based learning experience.	All unit learning goals in communication, collaboration,

				creativity, and critical thinking.

Unit Resources

Type	Purpose/Description	Access the Resource
Design and Sketch Materials	Graph paper, writing utensils in an assortment of colors, and sticky notes for designing, sketching, and annotating user interfaces.	Gather materials for sketching.
App Development Software	Software for developing an instructional app.	*Recommendation:* Lumavate
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)*	
• Anthropogenic • Application • Climate Change	• Coalition • Mitigate • Metrics	• Quality Assurance • Render	• User Experience • User Interface • Wireframing

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 objective. May result in a change in the time, input, output, or size of learning experiences.*	Provide examples of major topics in climate change.	Students research or explore educator-curated examples. Supports students who benefit from concrete examples.
	Provide examples of educational apps with high-impact engagement features highlighted.	Supports students who benefit from 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 an application template.	Provide a template for their application.
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 Design Requirements	Place additional requirements on the design of the application to ensure high user engagements. Potential requirements may be connected to gamification, differentiation, accessibility, and branding.
Extension *A way of extending the*	Students enter their solutions into the New	Students, with the support of an educator, can enter their design solutions into the STEAM Tank

learning of a unit, objective, or lesson.	Jersey STEAM Tank competition.	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 sketching 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	Ask		
Day 2		Students will be able to identify important issues surrounding a complex global issue.	Students will identify and track a list of "knows" and "must-knows."
Day 3	Imagine		
Day 4		Students will be able to research multiple issues surrounding a complex global issue and distinguish key facets.	Students will organize research with high-impact information highlighted.

Day 5	Design		
Day 6			
Day 7		Students will be able to wireframe the design of their educational app.	Students will create and annotate sketches of the Learn, Discuss, and Try areas of their app and spotlight features that enhance interactivity and user engagement.
Day 8	Create		
Day 9			
Day 10			
Day 11		Students will be able to create a digital application.	Students will create a full-scale render of their app, showcasing as much of the UI/UX as possible.
Day 12	Test		
Day 13			
Day 14		Students will be able to explain and justify design choices. Students will be able to provide actionable feedback relating to the design and content of a digital application.	Students will conduct a data analysis of peer feedback.
Day 15	Reflect	Students will be able to reflect on the problem-based learning experience and the importance of effective communication in STEAM fields.	Students will write a journal reflection of their learning experience.