PROJECT DESIGN: OVERVIEW

Name of Project: The Changing Earth and Rising Seas		**Duration: 4 Weeks**
Subject/Course: Science	**Teacher(s): Mrs. Wilson**	**Grade Level: 3rd**
Other subject areas to be included, if any: Writing (W.3.2: Informative), Reading (RI 3.1: Ask/Answer Questions), Mathematics (MP.4. Model w/Mathematics, 3.MD.B.3 Draw a Scaled Bar Graph, 3.MD.B.4 Measure lengths and show data by making a line plot)		

Key Knowledge and Understanding (CCSS or other standards)	3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. 3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there change. LS2.C: When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to a transformed environment, and some die. 3-ESS3-1 Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. ESS3.B A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impact. W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons.			
Success Skills (to be taught and assessed)	Critical Thinking/Problem Solving	x	Self-Management	x
	Collaboration	x	Other:	
Project Summary (include student role, issue, problem or challenge, action taken, and purpose/beneficiary)	In the role of climate scientists, astronomers, and geologists, students will look at primary sources of NASA data, and will write information pieces on the effects of climate change on the world's oceans, including the coral reefs and the glacial ice around the globe. Students will come up with a tangible solution to the issue of coral reef demise (oxybenzone free sunscreen) and will present their findings to their school peers.			
Driving Question	In the role of climate scientists, how can we understand the impact of earth's rising temperatures on the oceans, and how can we create tangible solutions to positively impact the polar ice and the coral reefs around the globe?			
Entry Event	Tell students that some people wonder if one to two degrees of temperature change makes an impact on the planet. Today we are going to look at some of the effects on the water on earth, and we will begin to look at some primary sources on what scientists are seeing. View Blue Planet 2 video on reefs episode (43:00-45:00); view climate time machine: https://climate.nasa.gov/interactives/climate-time-machine			
Products	Individual: Informative Writing Piece: The Rising Seas Opinion Writing: Oxybenzone Sunscreen Graphs		Specific content and competencies to be assessed: W.3.2: Informative Writing 3-LS4-4 Claim about Merit of Solution; W.3.1 Opinion 3.MD.B.3 Scaled Bar Graph; 3.MD.B.4: Line Plot	
	Team: Glacier vs. Iceberg Demonstration Natural Sunscreen		Specific content and competencies to be assessed: LS2.C 3-LS4-3; 3-ESS3-1; ESS3.B	

	Global Warming Demonstration	3-LS4-4

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Making Products Public (include how the products will be made public and who students will engage with during/at end of project)	Students will share writing and products with different grade levels at school. Parents and administrators will be invited to hear small group presentations on 1. The Rising Seas Information Piece; 2. Oxybenzone Solution for Coral Reefs Opinion Piece. 3. Observe Glacial vs. Iceberg Demonstration 4. Sample Oxybenzone free sunscreen. Each student will play a role in the presentation.
Resources Needed	On-site people, facilities: Prefunction Room or MPR
	Equipment: Chairs set up in circles of 4-8. 70-140 chairs total (depending on availability)
	Materials: Ice, clay, containers, rulers, graph paper, balloons, lighter, bottle of water, safety goggles, bucket, IPads, sunscreen, SunArt Paper, zinc oxide, titanium dioxide, gloves, running water, plastic containers
	Community Resources: Parents to help with Demonstration; Facilities to set up/tear down chairs

Reflection Methods (how individual, team, and/or whole class will reflect during/at end of project)	Journal/Learning Log	x	Focus Group	
	Whole-Class Discussion	x	Fishbowl Discussion	
	Survey		Other:	

Notes:
Students will reflect upon their learning and feelings about the content through journaling several times throughout the unit. They will reflect on their success in group work through class discussions after each group work lesson. The teacher will facilitate a whole-class discussion after the presentation to parents and other students to find out how well the information was received, and how effective students thought their communication was.

PROJECT DESIGN: STUDENT LEARNING GUIDE

Project: The Changing Earth and Rising Seas

Driving Question: In the role of climate scientists, how can we understand the impact of earth's rising temperatures on the oceans, and how can we create tangible solutions to impact the polar ice and the coral reefs around the globe?

Final Product(s) Presentations, Performances, Products and/or Services	**Learning Outcomes/Targets** knowledge, understanding & success skills needed by students to successfully complete products	**Checkpoints/Formative Assessments** to check for learning and ensure students are on track	**Instructional Strategies for All Learners** provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
Rising Seas Informative Writing	Students need to know how to read and interpret bar graphs. They need to know where glaciers and sea ice are around the globe, and which is causing the melt. They need to know what thermal expansion is. They need to have completed informative writing lessons.	1. Math Worksheets on graphing 2. Writing notebook daily entries during UOS informative writing lessons 3. Worksheets from Climate Kids Website Research and Rising Seas lesson 4. Graphs from NASA Data 5. Science Notebook entries from Rising Seas Lesson	1. Math lessons on graphing 2. Units of Study lessons 1-17 on informative writing 3. NASA Climate Kids Website: **https://climatekids.nasa.gov/polar-temperatures/** **https://climatekids.nasa.gov/10-things-glaciers/** 4. TED Talk on Polar Ice and Rising Seas https://www.youtube.com/watch?v=ofaoiHYKtlc https://www.youtube.com/watch?v=f7sEhuSbQo8
Oxybenzone Sunscreen Opinion Writing	Students need to know what Oxybenzone is. They need to know about damage to coral reefs, toxicity to humans, and sunscreen alternatives. They need to know the impact of rising temperatures on coral reefs.	1. Science notebook entries from Oxybenzone lesson 2. Writing Notebook entries from UOS lessons on opinion writing 3. Notes from experiment with sunscreen	1. Science lesson on Oxybenzone's toxicity to humans and damage to coral reefs 2. Units of Study opinion writing lessons 1-17 3. Experiment with various sunscreens to determine effectiveness

Glacier vs. Iceberg Demonstration	Students need to know what glaciers and icebergs are. They need to know where glaciers and icebergs are located around the globe.	1. Worksheet on glacier vs. icebergs 2. Notes in science notebooks on glaciers and icebergs' locations.	1. TED Talk on Polar Ice and Rising Seas https://www.youtube.com/watch?v=ofaoiHYKtlc 2. https://www.youtube.com/watch?v=f7sEhuSbQo8
Natural Sunscreen	Students need to understand why it is important to create a sunscreen without oxybenzone. They need to know how to make a sunscreen alternative and test its effectiveness.	1. Science notes on sunscreen experiment with claim, evidence, and reasoning.	1. Articles on oxybenzone and the coral reefs and oxybenzone's impact on the human body read together as a class: https://www.ewg.org/enviroblog/2015/10/sunscreen-ingredient-toxic-coral-reefs 2. https://www.ewg.org/news/news-releases/2008/03/25/cdc-americans-carry-%E2%80%98body-burden%E2%80%99-toxic-sunscreen-chemical
Global Warming Demonstration	Students need to know that the ocean has more capacity to absorb most of the heat that is trapped in our warming world, but that this is causing the oceans to warm.	1. SeeSaw Video with an explanation of the balloon experiment (completed in small groups).	1. Video demonstration and JPL lesson with the balloon experiment: https://www.jpl.nasa.gov/edu/teach/activity/global-warming-demonstration/