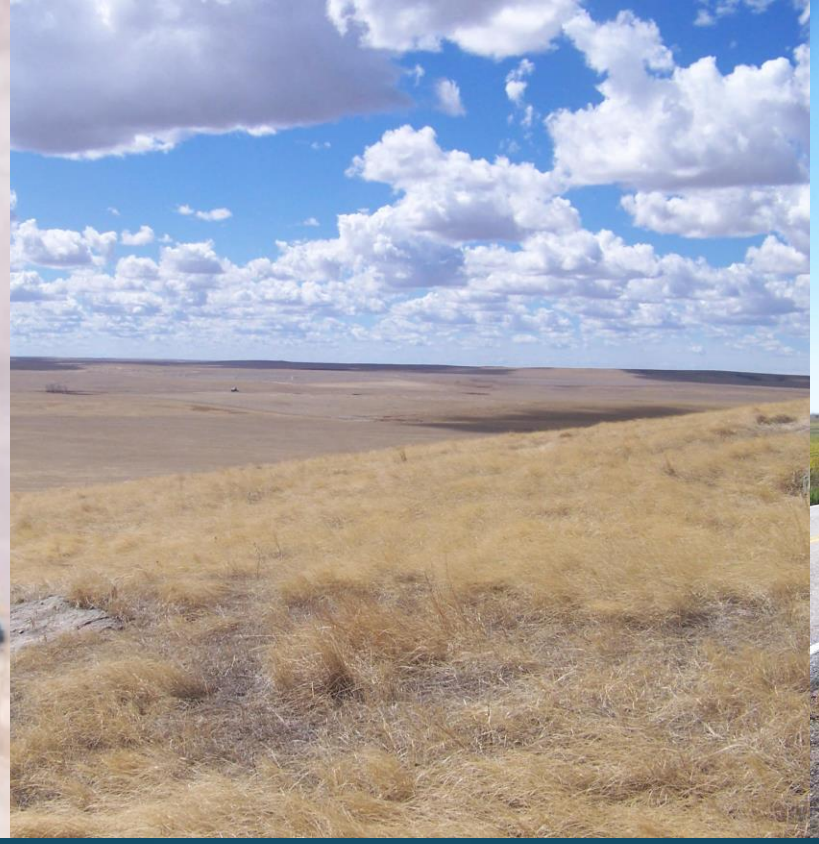



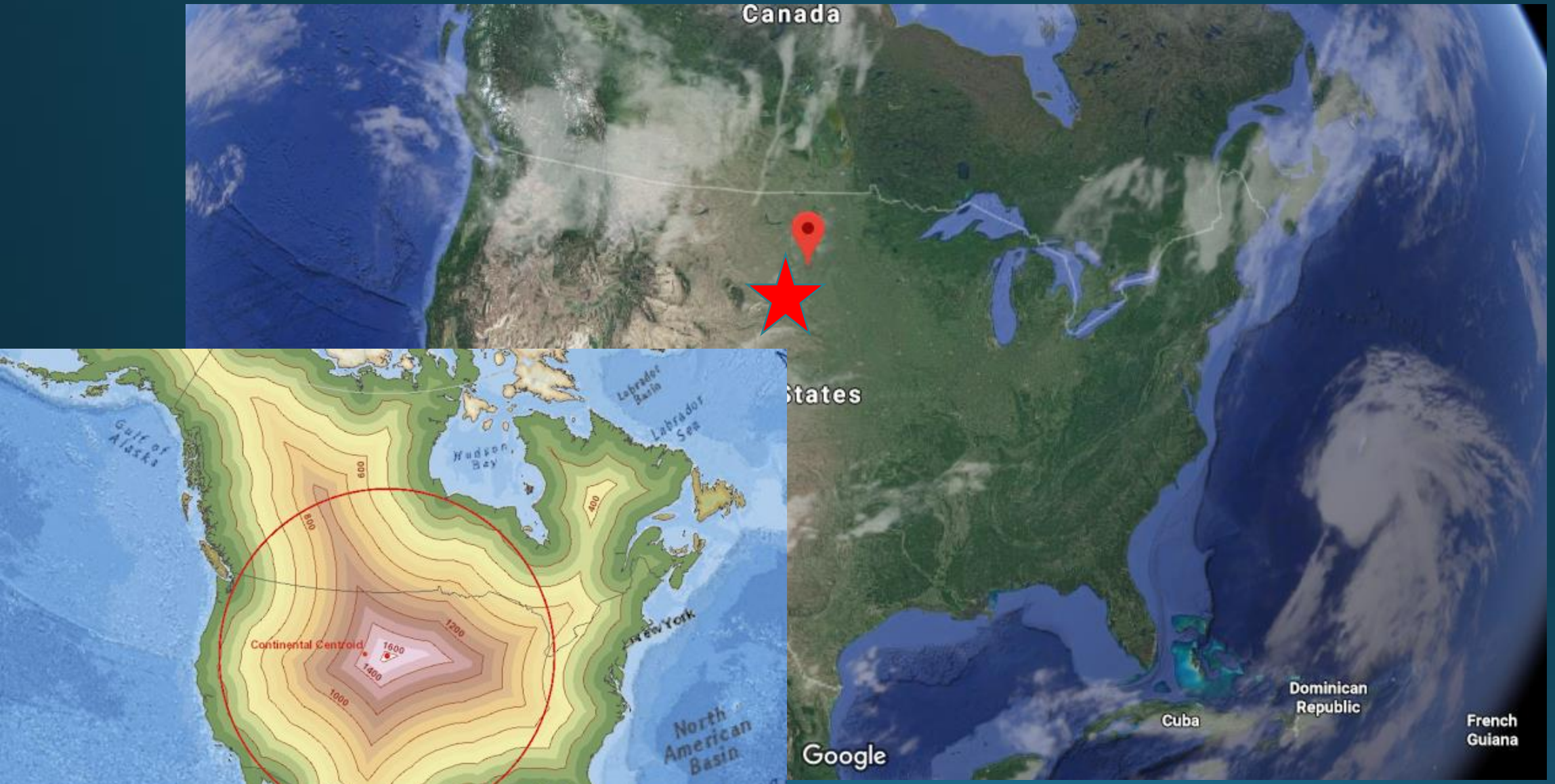

Bringing Ocean Science to North America's Great Interior

Pole of Inaccessibility

Spencer Cody, 6-12 Science,
Edmunds Central School District, Roscoe, South Dakota

The Challenge

The Challenge



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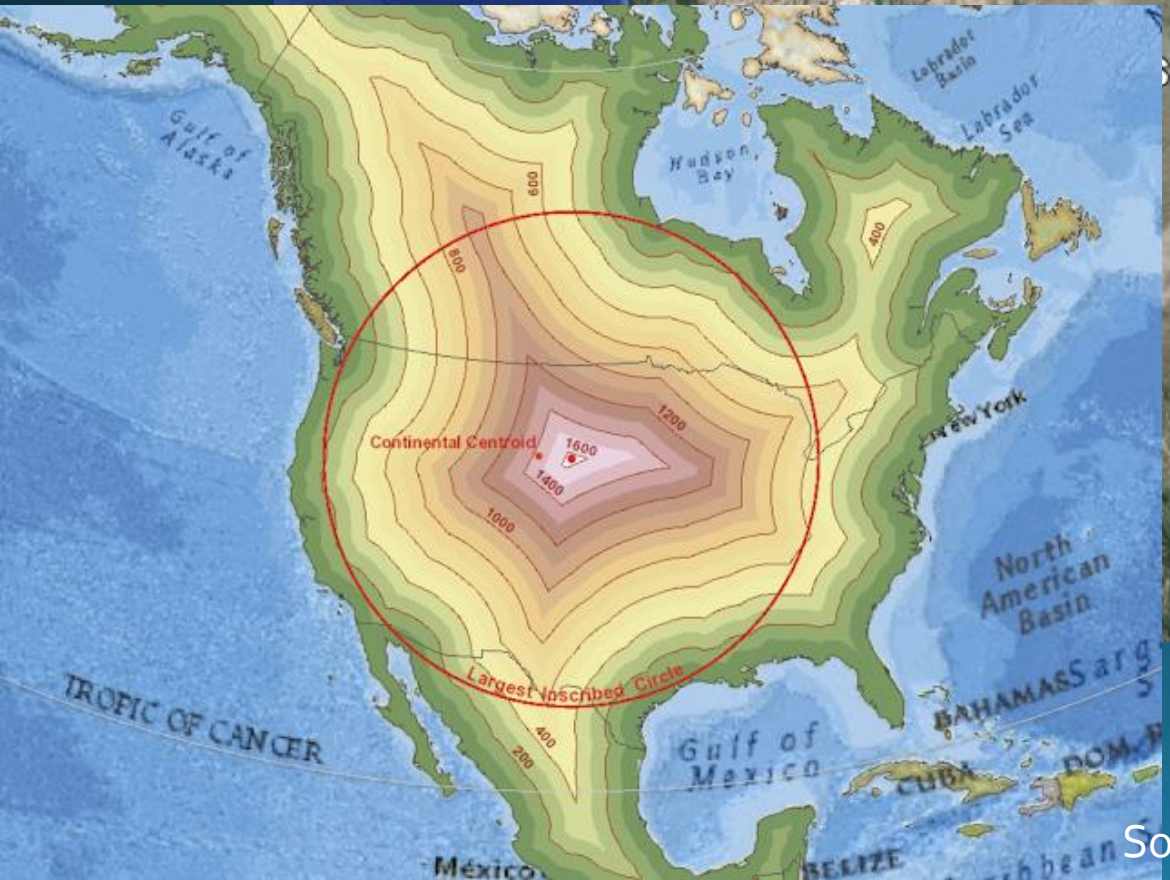
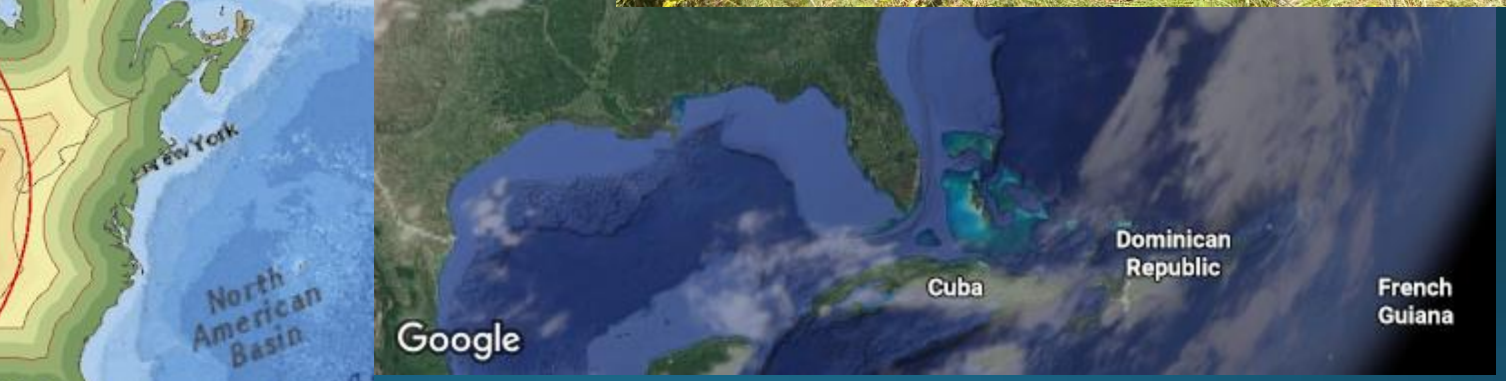
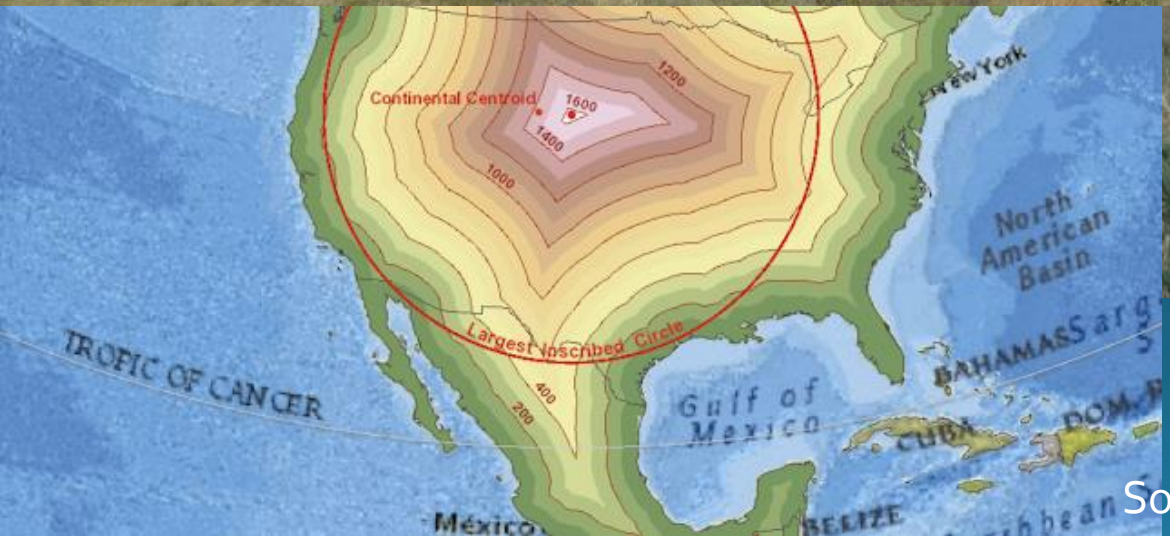




The Challenge

Sources: Google Maps, Penryfamily.com, and Tywkiwdbi.blogspot.com



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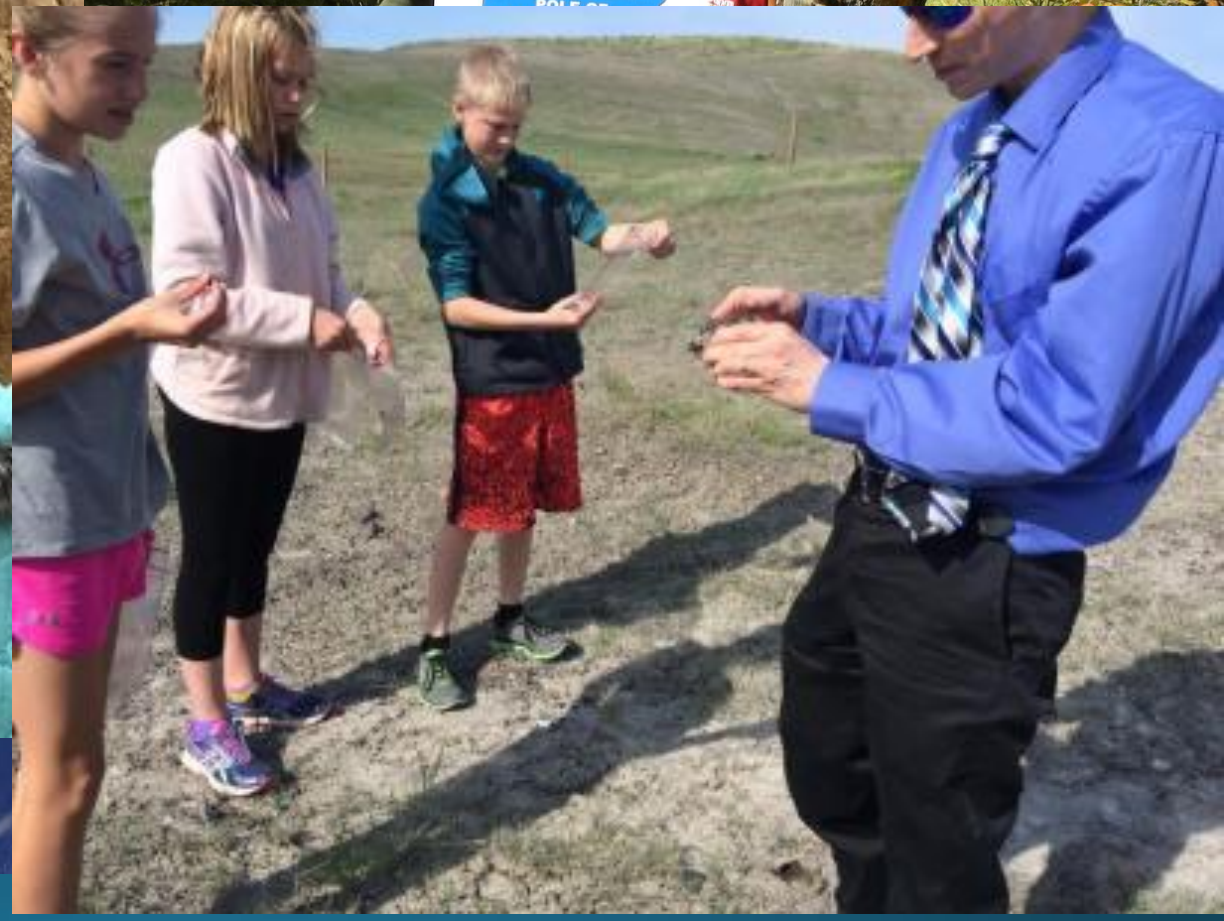


The Challenge

Sources: Google Maps, Penryfamily.com, and Tywkiwdbi.blogspot.com

Yet…

The Challenge

Sources: Google Maps, Penryfamily.com, and Tywkiwdbi.blogspot.com

Yet…

HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. (SEP: 2; DCI: LS2.B, PS3.D; CCC: Systems)

HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (SEP: 5; DCI: LS2.B; CCC: Energy/Matter)

HS-LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. (SEP:6; DCI: LS2.B; CCC: Energy/Matter)

HS-LS2-2 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. (SEP: 5; DCI: LS2.A, LS2.C; CCC: Scale/Prop.)

HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. (SEP: 5; DCI: LS2.A; CCC: Scale/Prop.)

MS-ESS3-5 Ask questions to clarify evidence of the factors that may have caused a change in global temperatures over the past century. (SEP: 1; DCI: ESS3.D; CCC: Stability/Change)

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per- capita consumption of natural resources impact Earth's systems. (SEP: 7; DCI: ESS3.C; CCC: Cause/Effect, Technology, Nature Science/Consequence-Actions)

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (SEP: 6 ; DCI: ESS3.C; CCC: Cause/Effect, Technology)

MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (SEP: 4; DCI: ESS3.B; CCC: Patterns, Technology)

HS-ESS2-1 Analyze geoscience data to make the clair that one change to Earth's surface can create feedback that cause changes to other Earth systems. (SEP: 2; DCI: ESS2.A, ESS2.B; CCC: Stability/Change)

HS-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. (SEP: 6; DCI: ESS1.C, PS1.C; CCC: Stability/Change)

HS-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. (SEP: 7; DCI: ESS1.C, ESS2.B, PS1.C; CCC: Patterns)

HS-LS4-6 Use a simulation to research and analyze possible solutions for the adverse impacts of human activity on biodiversity. (SEP: 5; DCI: LS4.C, LS4.D, ETS1.B; CCC: Cause/Effect)

HS-LS4-5 Evaluate the evidence supporting claims tha changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. (SEP: 7; DCI: LS4.C; CCC: Cause/Effect)

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (SEP: 6; DCI: LS2.C, LS4.D, ETS1.B; CCC: Stability/Change)

HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms under stable conditions; however, moderate to extreme fluctuations in conditions may result in new ecosystems. (SEP: 7; DCI: LS2.C; CCC: Stability/Change)

Standards

HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (SEP: 5; DCI: ESS2.D, ESS3.D; CCC: Systems)

HS-ESS3-5 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. (SEP: 4; DCI: ESS3.D; CCC: Stability/Change)

HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. (SEP: 6; DCI: ESS3.C, ETS1.B; CCC: Stability/Change, Technology)

HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. (SEP: 5; DCI: ESS3.C; CCC: Stability/Change, Technology)

HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. (SEP: 6; DCI: ESS3.A, ESS3.B ; CCC: Cause/Effect, Technology)

HS-ESS2-4 Plan and carry out an investigation of the properties of water and its effects on Earth materials and surface processes. (SEP: 2; DCI: ESS1.B, ESS2.A, ESS2.D; CCC: Cause/Effect)

HS-ESS2-3 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (SEP: 2; DCI: ESS2.A, ESS2.B, PS4.A; CCC: Energy/Matter, Technology)

HS-ESS2-2 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. (SEP: 4; DCI: ESS2.A, ESS2.D; CCC: Stability/Change, Technology)

MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (SEP: 6; DCI: ESS3.A ; CCC: Cause/Effect , Technology)

MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (SEP: 2; DCI: ESS2.C, ESS2.D; CCC: Systems)

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (SEP: 3; DCI: ESS2.C, ESS2.D; CCC: Cause/Effect)

MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (SEP: 2; DCI: ESS2.C; CCC: Energy/Matter)

MS-ESS2-3 Analyze and interpret data on the age of the Earth, distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (SEP: 4; DCI: ESS2.B, ESS1.C; CCC: Patterns)

MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (SEP: 6; DCI: ESS2.A, ESS2.C; CCC: Scale/Prop.)

MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (SEP: 2; DCI: ESS2.A; CCC: Stability/Change)

MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth. (SEP: 4; DCI: LS4.A; CCC: Patterns)

MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (SEP: 7; DCI: LS2.C, LS4.D, ETS1.B ; CCC: Stability/Change, Technology)

MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (SEP: 7; DCI: LS2.C ; CCC: Stability/Change)

MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (SEP: 2; DCI: LS2.B; CCC: Energy/Matter)

MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (SEP: 6; DCI: LS2.A; CCC: Patterns)

MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (SEP: 4; DCI: LS2.A; CCC: Cause/Effect)

MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (SEP: 2; DCI: LS1.C, PS3.D; CCC: Energy/Matter)

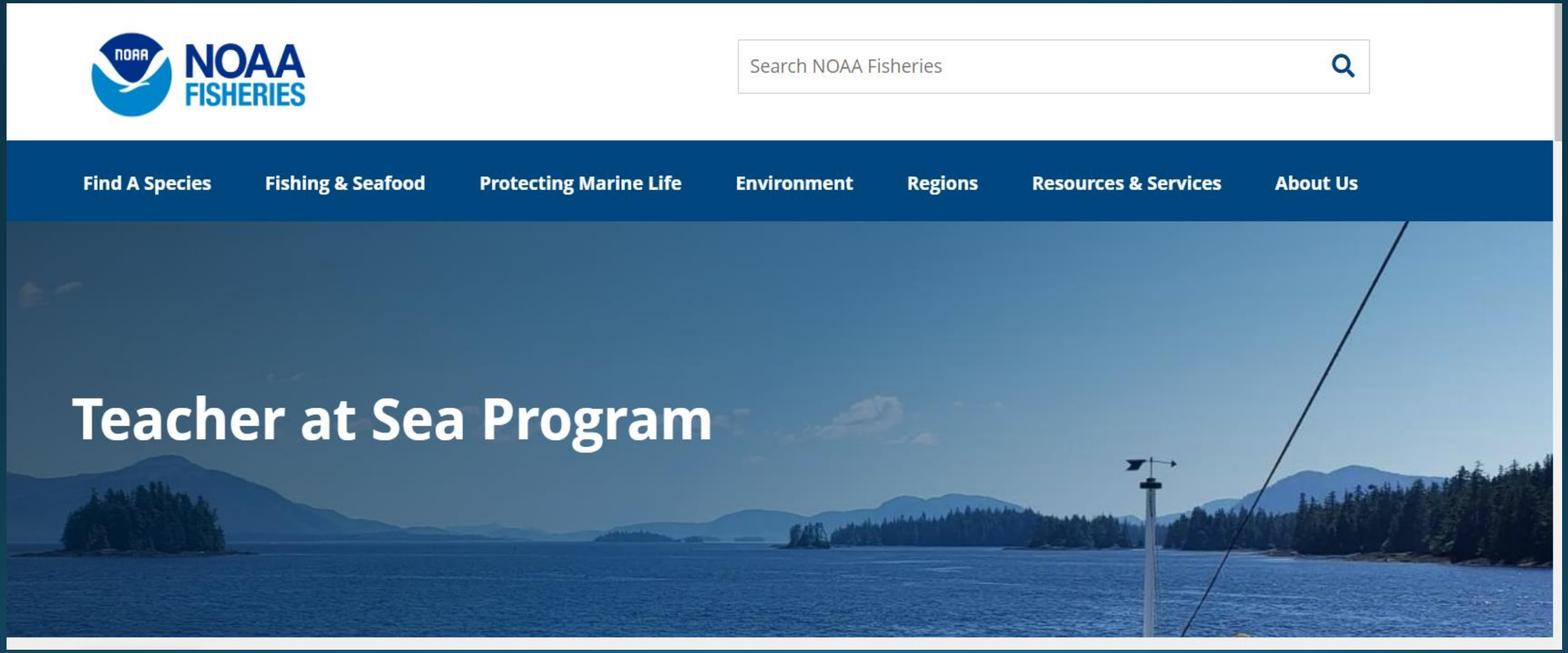
MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (SEP: 6, Nature Science/Empirical Evidence; DCI: LS1.C, PS3.D; CCC: Energy/Matter)

MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (SEP: 6; DCI: LS1.B; CCC: Cause/Effect)

The Challenge

Sources: Planbook and South Dakota State Standards

NOAA Teacher at Sea



The Solution

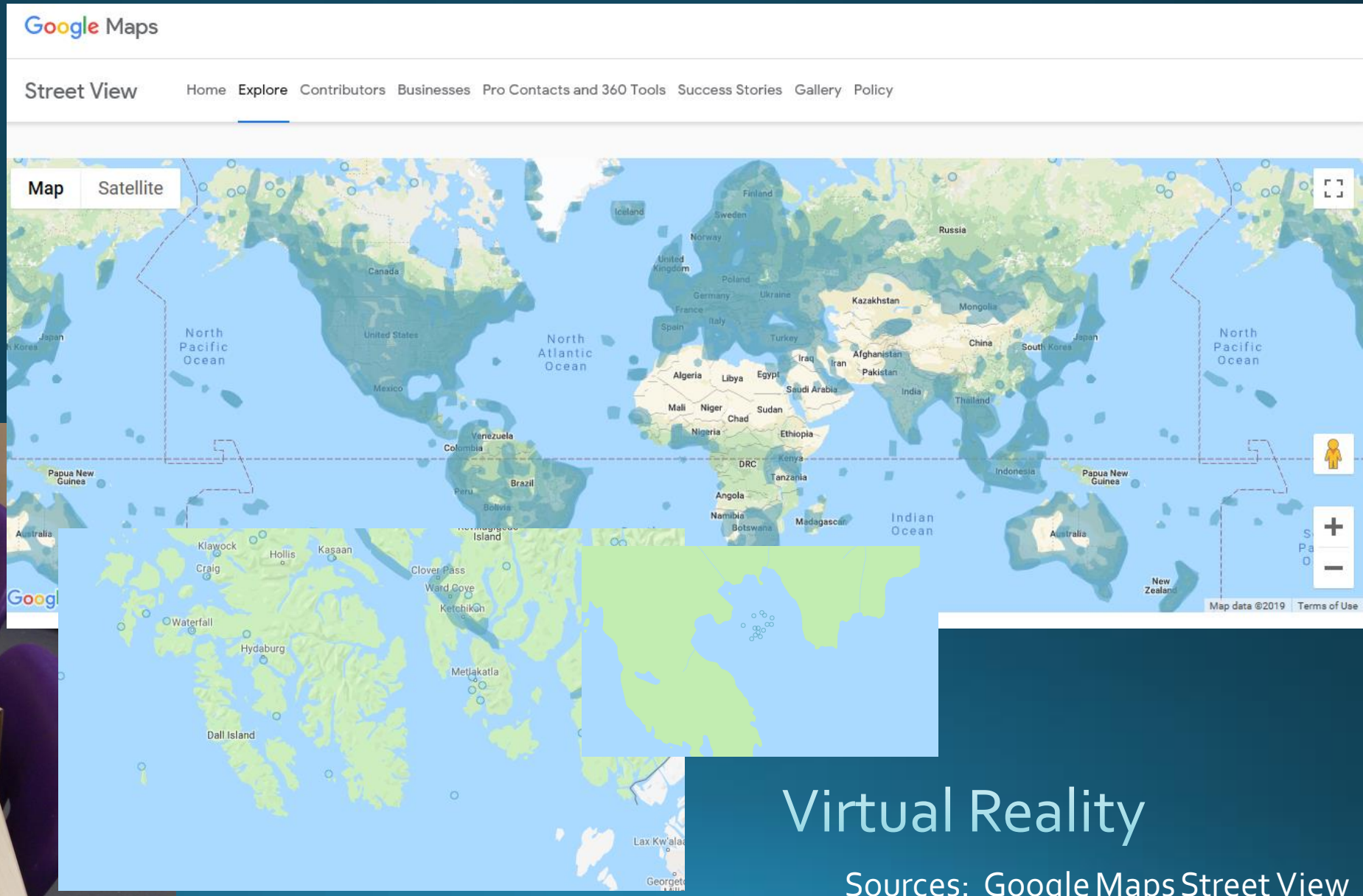
Sources: NOAA Teacher At Sea

NOAA Teacher at Sea

The Solution

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea



Virtual Reality

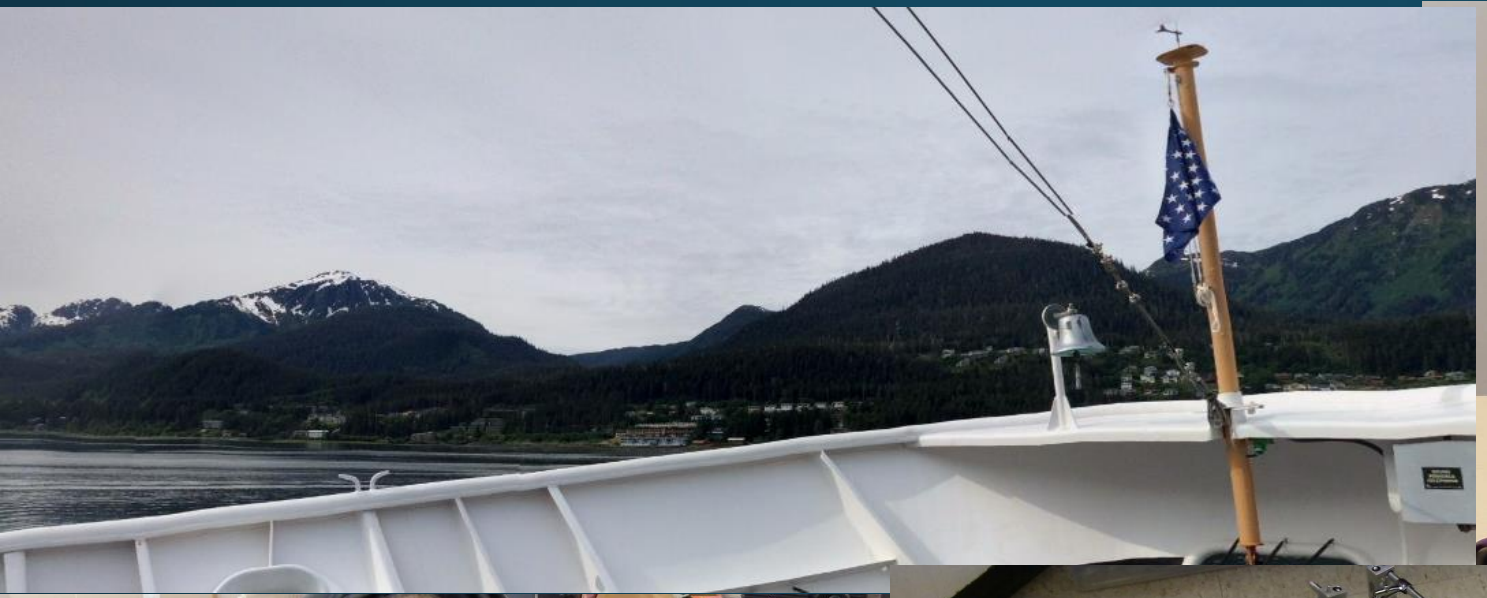
Sources: Google Maps Street View

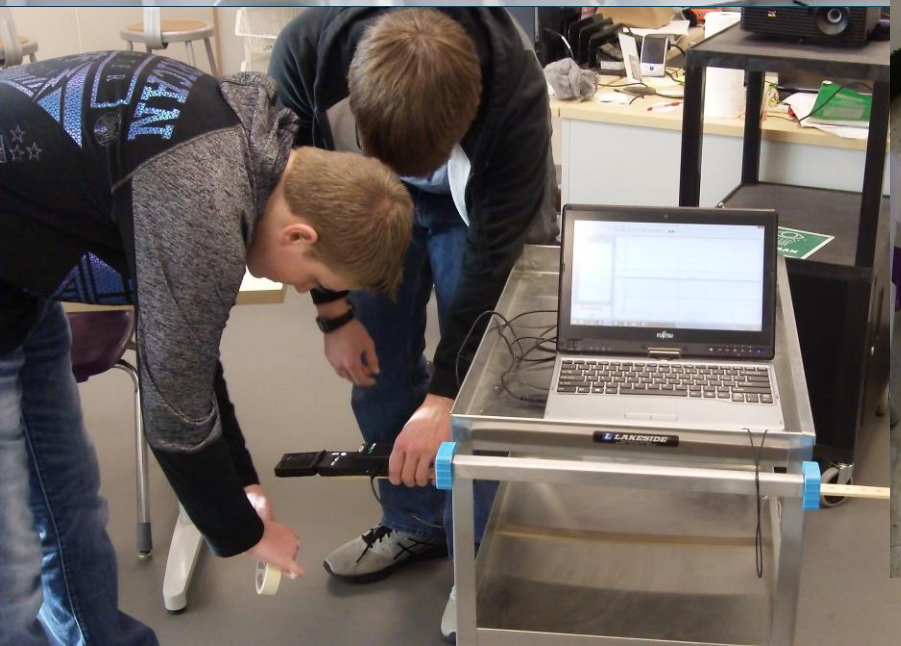
NOAA Teacher at Sea

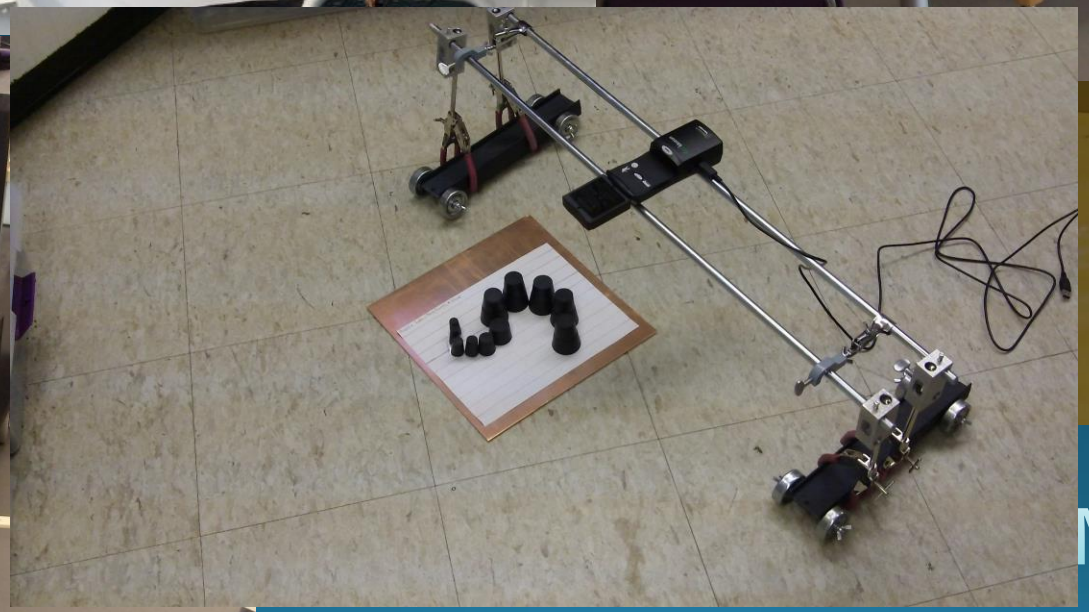
Tides

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea



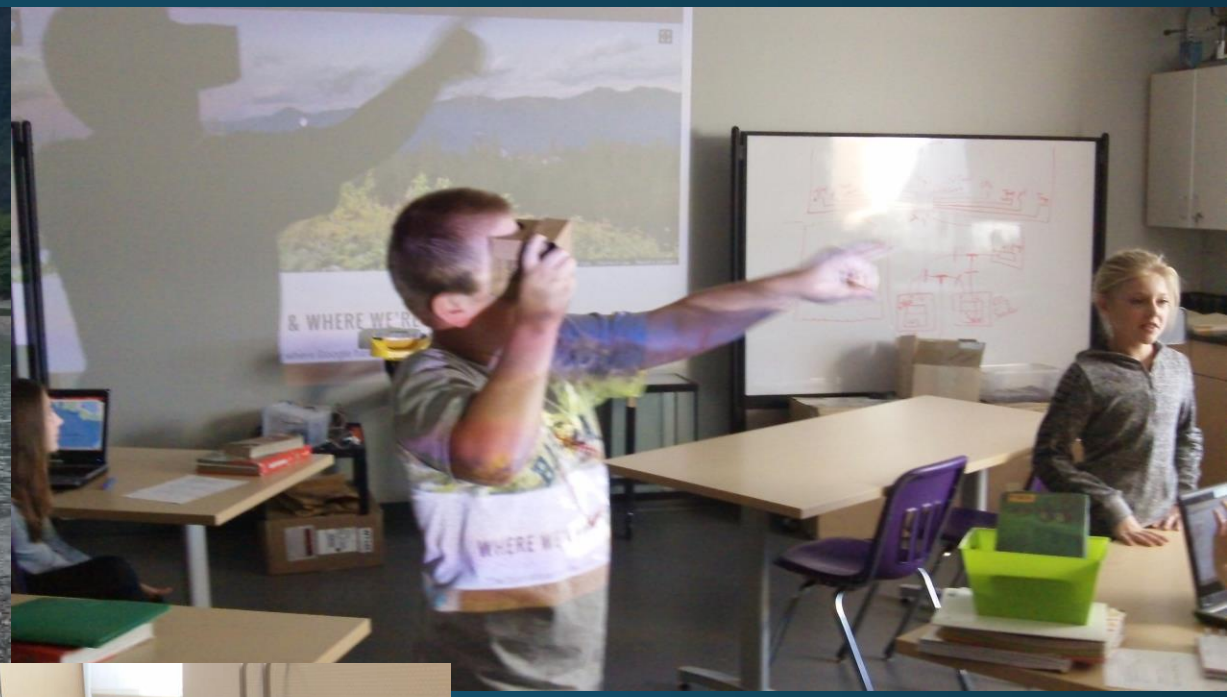


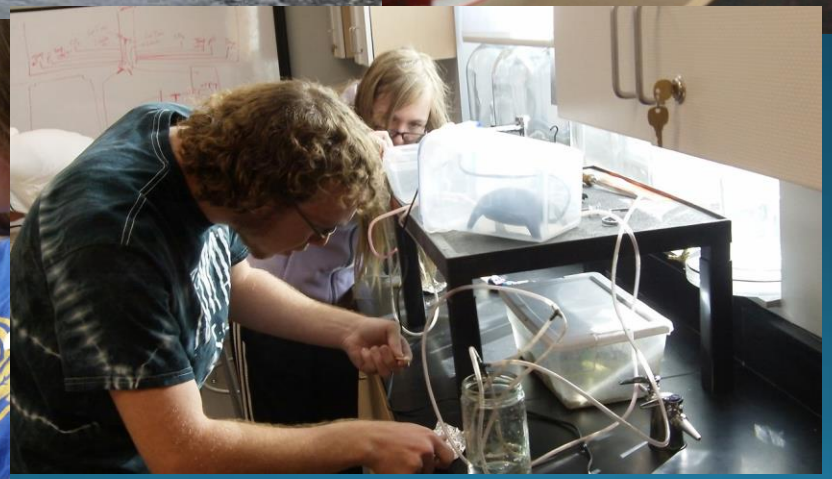


Mapping

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea





Climate Change

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea

Geology

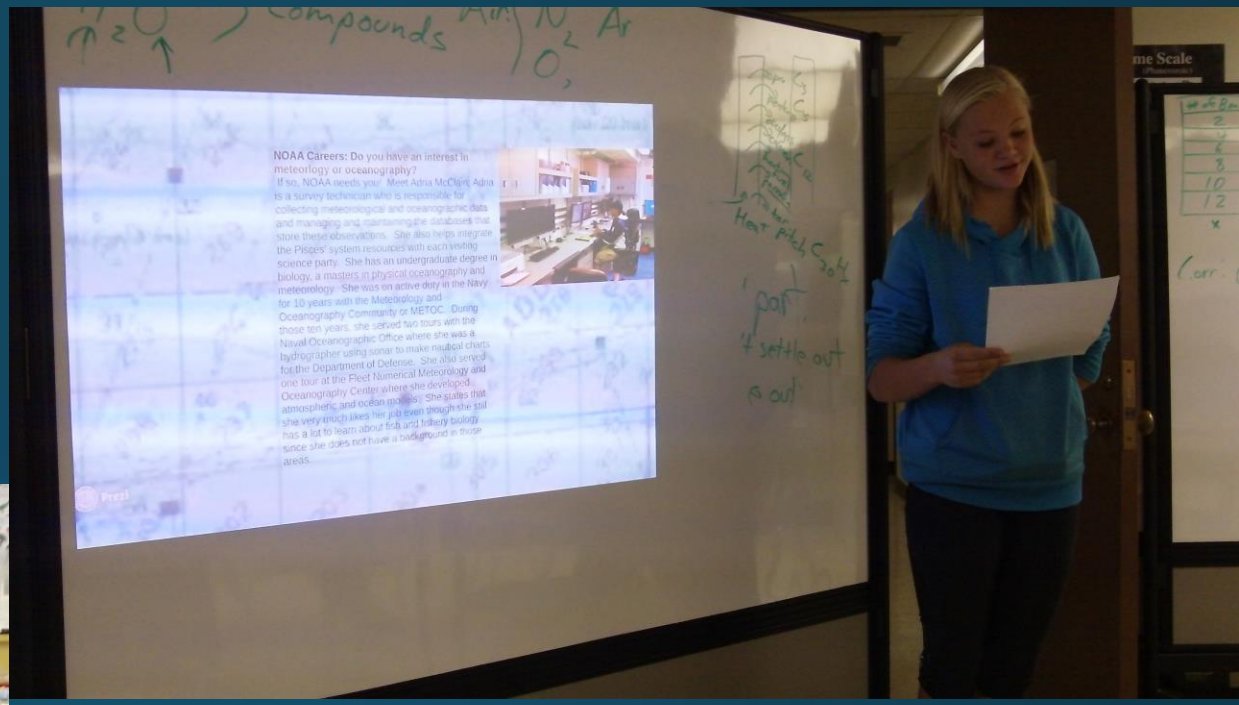
Sources: NOAA Teacher At Sea

NOAA Teacher at Sea

Algae and Fish Surveys

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea



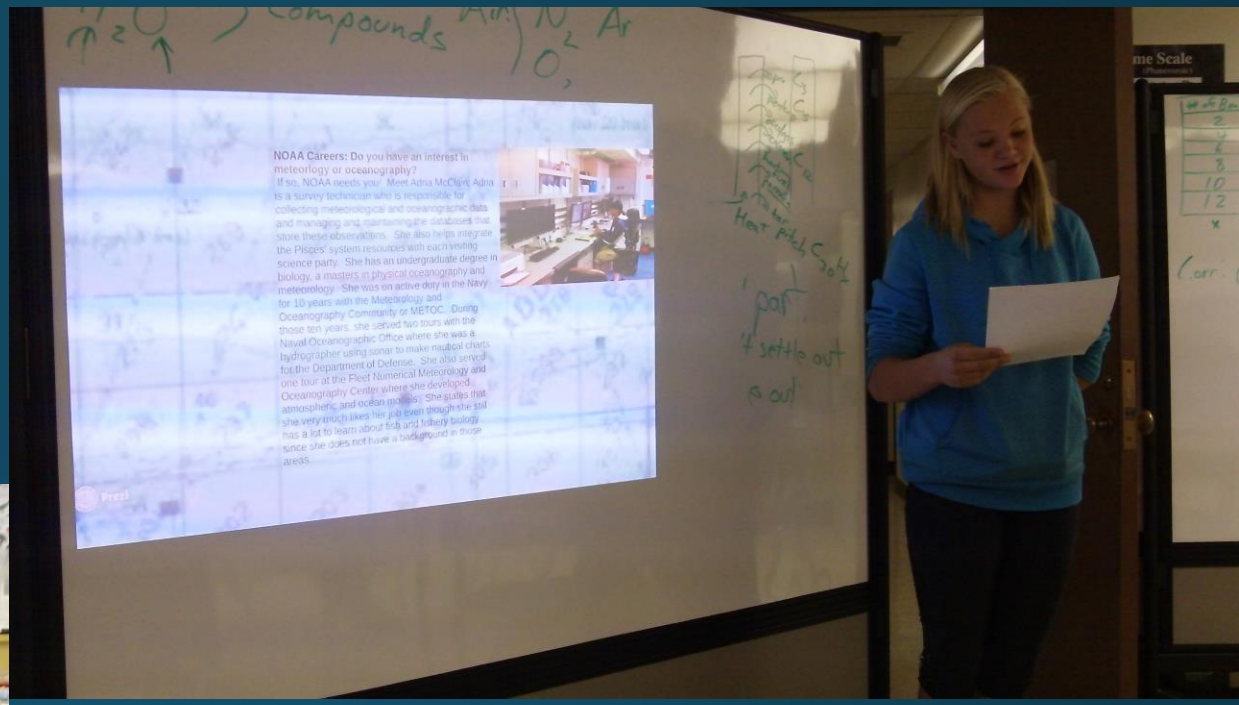
Career Interest

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea

Formative and Summative Assessments:
63.2% retention of non-Teacher at Sea science content

86.9% retention of Teacher at Sea science content



Real Results

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea

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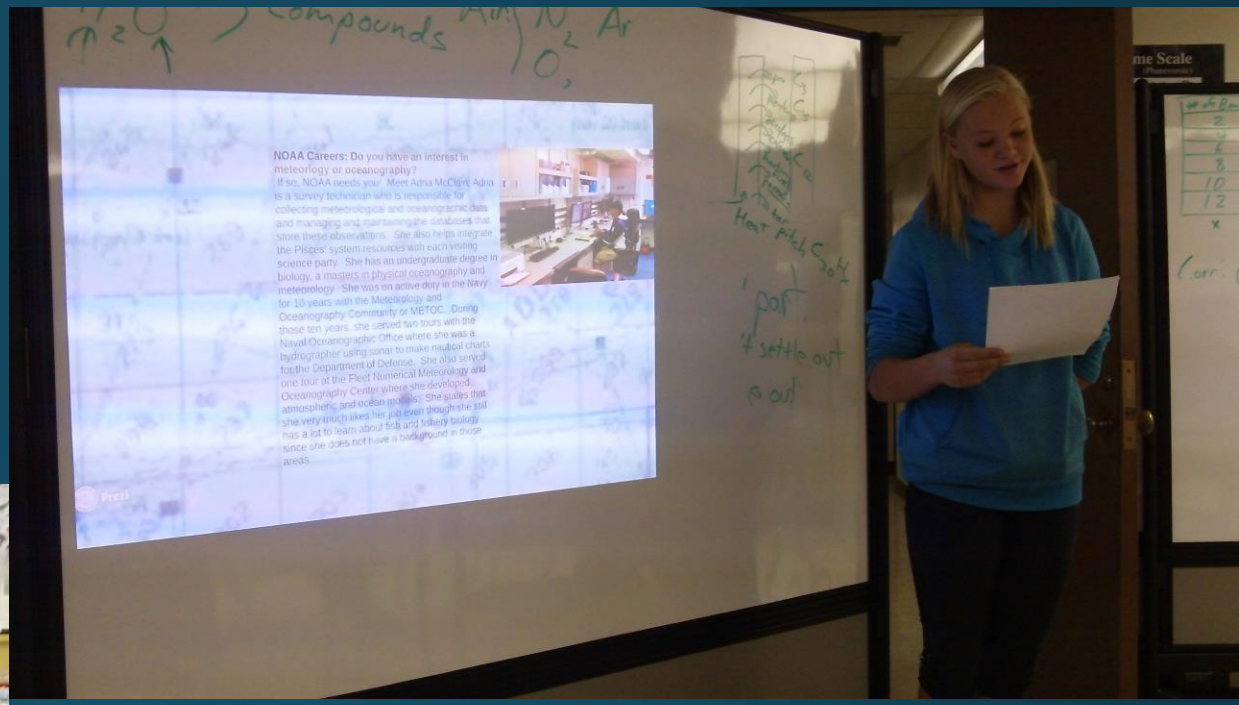


Career Interest Inventories:

125% increase in students indicating a STEM career

Real Results

Sources: NOAA Teacher At Sea

NOAA Teacher at Sea Alumni

Pascagoula Lab Visit

American News

Schaunaman to challenge Le sen for mayoral post

One city council seat also contested

Horse racing in Aberdeen takes big short-term step

By Cuyler Meade

South Dakota horse racing's uncertain future may be starting to clear up, at least in the near term.

On the same day the entity that runs the 70-plus-year-old annual horse racing event in Ft. Pierre decided to cancel this season's two-weekend schedule due to severe funding constraints, Gov. Kristi Noem signed a bill that would provide a modest short-term boost to the sport's viability in the state, making possible the summer tradition's continuation in Aberdeen.

Senate Bill 128, which the South Dakota state legislature website sdlegislature.gov shows as having been signed by the governor Wednesday (though

See Bill, 3A

MOREAU RIVER VALLEY

Homes, livestock threatened by record flooding

By Shannon Marvel

For residents in the Moreau River valley on the Cheyenne River Indian Reservation it's all hands on deck to prepare for flooding, with the worst yet to come.

At least 12 homes are flooding and have been evacuated, but 50 more are

Inside

2A: Read about how Aberdeen is helping Pine Ridge flood victims and what items can be donated to help out.

See Flooding, 2A

Edmunds Central students explore Mississippi gulf, career options

Edmunds Central students learn about bayou species such as magnolias and palmettos at the University of Southern Mississippi Outdoor Campus in Ocean Springs. From left, USM staff members speak with students Jaden Van Matre, Shane Lee, Chandler Pullman, Theodore Haerter, Paola Duran and Conner Preszler. Photos courtesy of Ryan Hawk Photography

By Elizabeth Varin

Some Edmunds Central students had not seen the ocean in person before spring break.

Now, 11 can say they've not only spent time on a beach, but also have visited crocodiles, surveyed marsh habitat and dissected a shark.

A group from the Roscoe school district took a field trip that started March 13 to southern Mississippi. The trip included time at the National Oceanic and Atmospheric Administration's Southeast Fisheries Science Center in Pascagoula, tours of different ships used by the administration, lessons at the University of Southern Mississippi Marine Education Center in Ocean Springs and surveys of different habitats.

Online

Find more photos from the trip in a photo gallery with this story at Aberdeen-News.com

Edmunds Central students Hope Hoerner and Conner Preszler learn about sharks during a dissection at the University of Southern Mississippi's Outdoor Campus in Ocean Springs.

The focus of the trip was exploring different National Oceanic and Atmospheric Administration careers, said Edmunds Central science teacher Spencer Cody.

"My hope is that they expanded their horizons to different careers in science, that they consider other options than what they were already aware of," he said. "Here people automatically associate NOAA with just the National Weather Service. It is true the National Weather Service is part of NOAA, but that's just a part of what they do. (The National Oceanic and Atmospheric Administration) also manages our fisheries and do different types of research associated with all the square miles of ocean

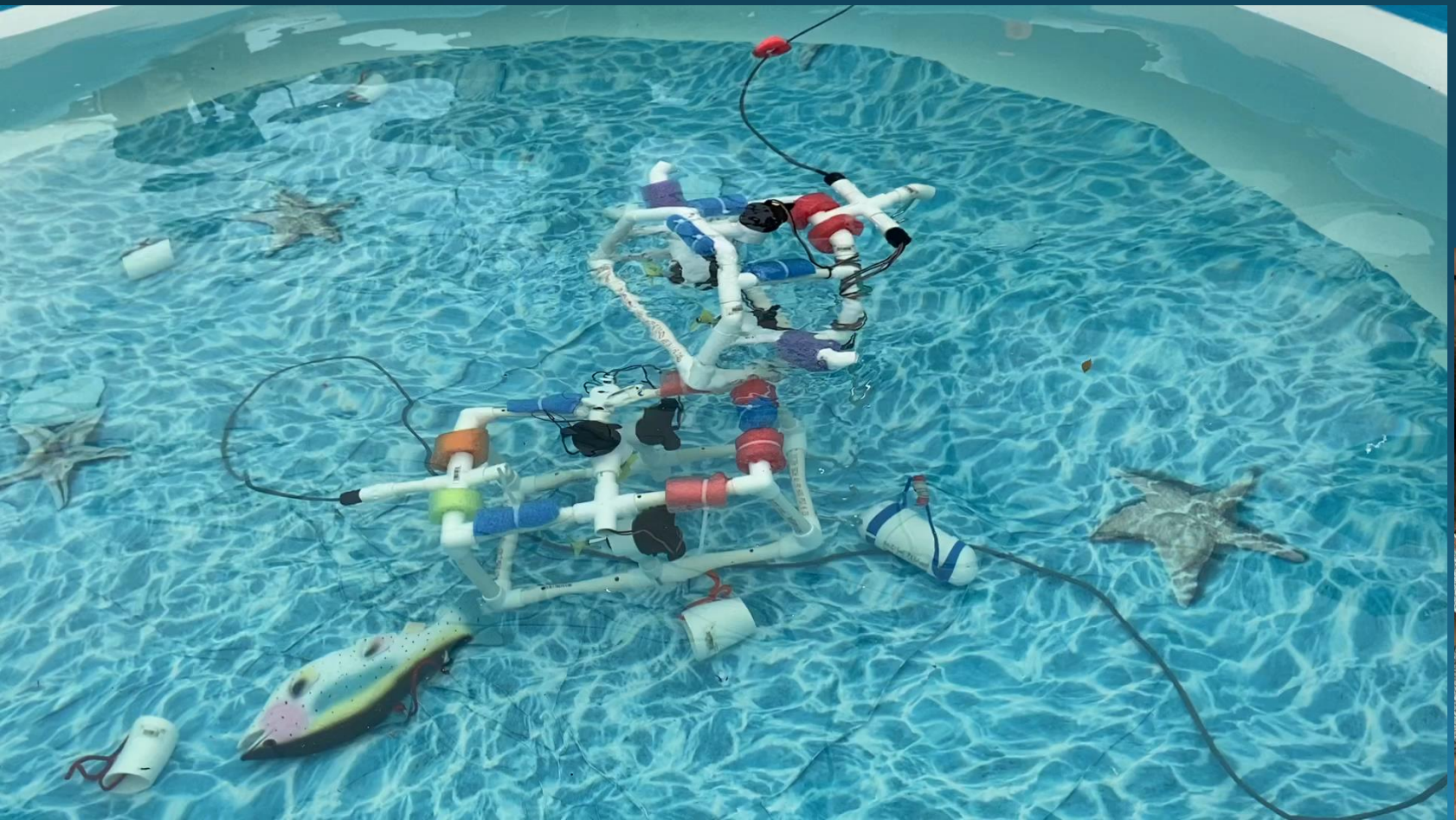
See Explore, 3A

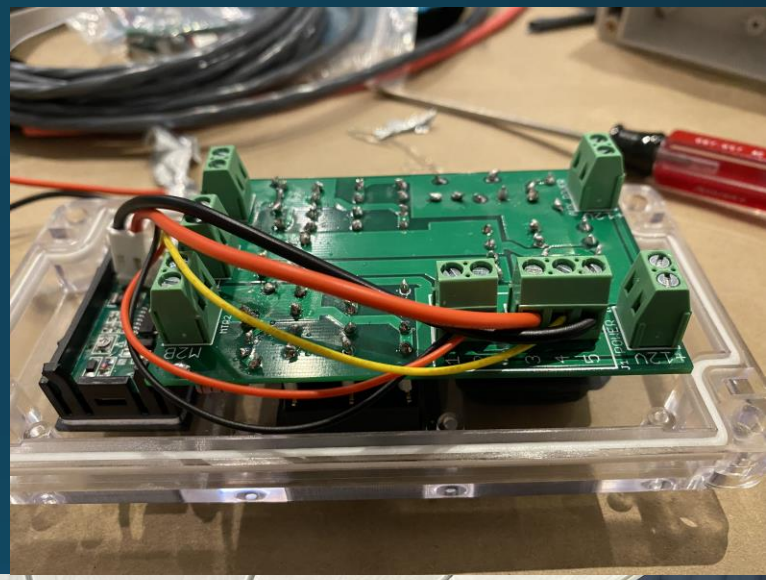
NOAA Teacher at Sea Alumni

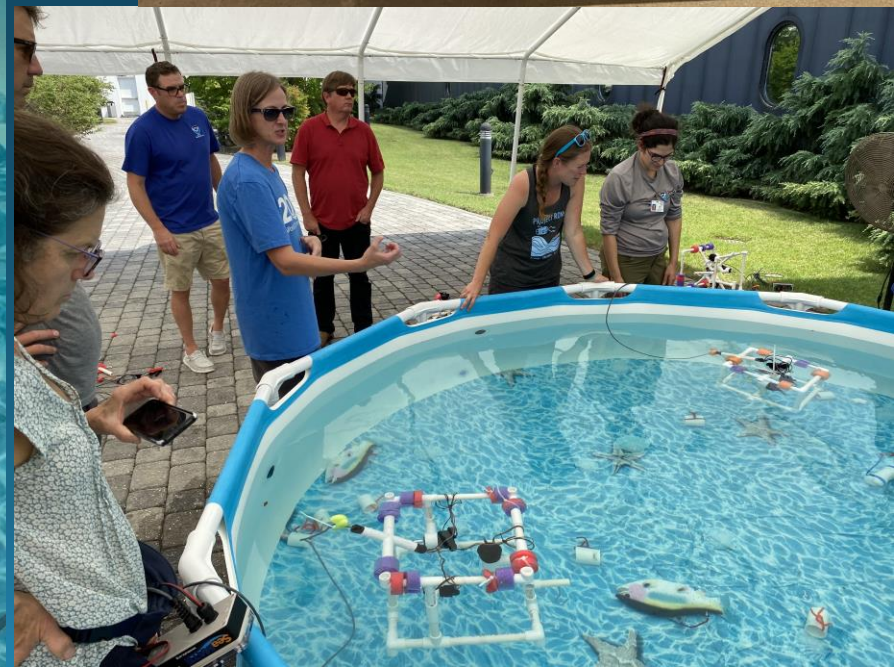
ROV Workshop in Newport News

NOAA Teacher at Sea Alumni

ROV Workshop in Newport News







NOAA Teacher at Sea Alumni

ROV Workshop in Newport News

NOAA Teacher at Sea Alumni

The Death and Life of the Great Lakes book study

NOAA Teacher at Sea Alumni

The Great Plains Ocean Institute

Questions?

TAS Alumni Program

Sources: NOAA Teacher At Sea