Topic: Environmental Monitoring
Lesson Title: Environmental Monitoring Lab
**   National Data Buoy Center**
Grade Level: 6th - 8th Grade
Science Domain: Earth Science

Connecting to the Next Generation Science Standards

ESS2.D –WEATHER AND CLIMATE: Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things.

The materials/lessons/activities outlined below are intended to help students reach the Performance Expectations listed below.

Performance Expectations: Develop a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	**Connections to Classroom Activity Students:** Students will begin to collect data to better understand how the uneven heating of the ocean causes currents and affects weather. This lesson focuses on how the data is collected and analyzed.
Science and Engineering Practices	
- Analyzing and interpreting data - Using mathematical and computational thinking	Students will use math and computational thinking to make a serial dilution to model how contaminants that are not visible are still affecting Earth's materials
Disciplinary Core Idea	
Earth's Systems Weather and Climate	Students will use data to determine how Earth's water and ocean systems work together to influence weather and climate.

Teacher Background Information

In the Environmental Monitoring exhibit at Infinity Science Center, students will see live data provided from several locations. One of those data centers is the National Data Buoy Center at the Stennis Space Center near the Science Center. Students will be able to see the live data on monitors in the exhibit. This data is able to support students' learning of weather phenomenon such as convection, ocean currents, atmospheric currents, hurricane formation, and many other weather and climate concepts. This lesson is focused around learning about the buoys, the data the buoys provide, and the opportunity to analyze the data that the buoy stations provide.

Statement of Learning Objective: ABCs – Audience, Behavior, Condition

Students will analyze data they collect from the National Buoy Data Center website and make predictions about ocean and air currents.

Materials:
- access to internet
- Student Sheets for National Buoy Data Center lesson
- PowerPoint for Environmental Monitoring NBDC lesson

Vocabulary:
buoy, ocean current, air current, wave height, convection

Literacy Connections:
- Scholastic Discover More: Ocean and Sea by Steve Parker
- Oceans by Seymour Simon
- DK Eyewitness Books: Oceans by Miranda Macquitty

5E Instructional Process:

Engage:
Activity
Ask students to discuss the following questions in their science groups:
- How can scientists get information such as ocean temperature, wind speed, salinity, and other weather data from different areas offshore?
- Why is it important for scientists to gather weather data?

Explore:
- Show students the PowerPoint about the National Buoy Data Center (NDBC) and the Environmental Monitoring exhibit at Infinity.
- Next, give students the Student Data Sheet.
- Ask students to access the NBDC website and fill in their data chart.
- Students will then answer the questions on their student data sheet.

Explain:
1. As a class, discuss the questions on the data sheet.
2. Ask students to predict which buoy conditions would be favorable for a hurricane to form. (Generally, ocean temperatures must be 80 degrees F or above to about 50 meters deep).   Depending on the month of this activity, there may not be favorable conditions at any of the buoy stations.
3. What other differences and similarities did you notice in buoy station data?
4. What could be the cause of the differences that you noticed in the station data?

Elaborate:

1. As a culminating activity, show the video about ocean observing sensors. The video link is below and is a 4-minute video.

   https://www.schooltube.com/video/806029b4e7564f0d9ccc/Observing%20the%20Ocean

Evaluate:

1. Use the Student Data sheet and class and group discussions to evaluate students' progress.

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