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Authentic Data Integration

The data source I have chosen involves water quality data on the Hudson River. My school is about 15 minutes away from the Hudson River and it's personally one of my favorite places to go recreationally. There are two websites that can be used to explore the data the first being Monitoring Our River's Improving Health (link: https://hudsonriverpark.org/the-park/parks-river-project/science/monitoring-our-rivers-improving-health/) from the Hudson River Park website. This first source is visually easy to interpret and contains information about the importance of each measurement like rainfall, risk of combined sewer overflows (CSOs), dissolved oxygen, water turbidity, pH, and salinity. This option is very good for struggling learners as it packages it all in one page and it is updated on a daily basis. The second option, which I find is appropriate for upper level classes or more advanced students, is the direct source for the Hudson River Park site. The Hudson River Environmental Conditions Observing System (HRECOS, link: https://ny.water.usgs.gov/maps/hrecos/) provides the real same-time data for the same parameters, however you can view specific sampling sites along the Hudson River. This provides an open-ended way for students to explore the data, allowing them to compare the data longitudinally overtime in one particular site or compare data from two different sites (upstream vs downstream, perhaps).

This data can be applied in different ways to a biology or chemistry class. In a biology class, this data links extremely well with the ecology and interdependence unit. The dependence between biotic factors, like chlorophyll production and the health of the river's fish population, is strongly connected to the abiotic factors like pH, water temperature, rainfall, and salinity. I would plan on using this data to kick off an ecology unit to look at long term trends of the Hudson River based on its history involving pollution from the IBM Corporation. By impacting the abiotic factors with chemical pollutants, biotic factors like the food web suffer. The data would also be a good application of biomagnification. It is not recommended to eat fish from the Hudson River due to their concentration of toxins. In a chemistry class, this data can be used to discuss what causes pH and salinity changes in the water on a chemical level with discussions on what happens when gasses dissolve in water and the reactions involved.

The use of data from such a local area will garner interest for students who find value in the Hudson River because it's so close to home. Students who use the Hudson River to recreationally fish, boat, or just simply hang out at the river's edge can find context in this data and how it might impact their recreational activities. As much as I love using data from other locations, it may not have as strong of an impact on students since they may not hold as much of a stake for other locations. The Hudson River data is more than numbers and units, it paints a picture of patterns for students who live so close to the river. The use of graphical analysis will also help students in the long term because graphs appear in everyday life in the news, so to have a better skill set in analyzing data will have a lasting impact beyond just the science classroom.

To connect to other disciplines, the Hudson River is a great vehicle because of its relevance in most of the subject areas. There are historical implications of how the river's data has changed over time due to the aforementioned pollution events with IBM. The data has had an impact on the legislation of dumping into the Hudson River over time. Although nature has recovered after its rather dirty history, the recovery means nothing if we can't regulate pollution into the Hudson River. The data can be even used to give an engineering challenge in which students are tasked to make a device that maintains the pH, salinity, and/or turbidity of the water at a certain level. While it may not be realistic to have such a device maintain these parameters for the entire river, it is the engineering design process that is most valuable for students to practice in such a task.

The Hudson River has provided sources of inspiration in the arts and humanities, and its data provides a wealth of information for students to apply their knowledge of science and engineering to. By using the HRECOS, students can find many ways to analyze the Hudson River data over time and space, helping them make connections between the biotic and abiotic environment.