

Engaging Context Data Integration

Terriann Weisenberg

Data Source: Weather Forecast
<https://www.wunderground.com>

In the fifth grade science curriculum of my school district there is a unit on the phenomenon of the air that surrounds us is organized into the Earth's atmosphere. Air plays an important role in weather and the atmosphere. To investigate this phenomenon, students can connect the local weather to activities in the atmosphere. The focus question for the investigation is "How do meteorologists measure and record weather variables?" To answer this question, students will create a weather station outside their school by using weather instruments to collect data about weather variables: temperature, humidity, wind speed, wind direction, visibility, air, and pressure. Having a hands-on approach to measuring and recording data is one way to obtain weather data. An extension to gathering daily data from the weather station would be collecting the local weather forecast from the internet.

A student-friendly website containing real-time weather information such as weather reports, weather forecasts, interactive worldwide maps, and severe weather conditions is Weather Underground. Weather data provided from the website Weather Underground allows students to search for the city they live in to find current weather variables and the forecast for the next 10 days. The teacher will need to explain and model to students how to use the website effectively. There are many ways for students to view the weather reports on this site.

Data collection from Weather Underground provides students with weather information to make comparisons with their class weather station data. There are two ways this information can be compared. The first way is to check Weather Underground each day to see if the weather variables are the same or different from the students' weather station data. Another comparison that students can make would be to write down the forecasted weather data for several days at the beginning of the week. As the week progresses students will look for similarities and differences of the collected data from the students' class weather station with the forecasted weather from the website. By comparing the data students can identify patterns and relationships to make predictions about the upcoming weather. Comparing the data from two sources addresses new objectives. By creating a class weather station and collecting the data from the station students investigate the initial objective of finding out how meteorologists measure and record weather variables. By exploring another source of weather information a second objective consists of having students compare daily and seasonal weather patterns to forecast the weather. Using logical reasoning to analyze, interpret, and compare weather variables gathered from the class weather station and the online forecast data enhances students' learning experience and will help in their understanding of how air plays a part in the weather. Looking to see if the website's predicted data was aligned with the

student-observed weather data allows students to compare this information. Students engage in science and engineering practices when they plan and carry out investigations, analyze and interpret data and construct explanations. Analyzing and interpreting the data can help students identify patterns and relationships which help them make conclusions about scientific principles such as air playing a role in the weather.

Weather Underground is an easy to read weather information website that has visual models such as maps and graphs for students to analyze and interpret. The time of the weather report is posted so students know they are viewing the current weather. There are interactive radar and satellite maps that can be used to collect weather variables for cities across the world. When using the interactive satellite map students can click on a specific city and click the “Current” tab to see the current temperature, wind speed, dew point, precipitation, pressure, humidity, daily precipitation, and visibility. In addition students can click the “Graph” tab to view a line graph displaying the temperature and dew point of the past twenty-four hours. The website also has a favorites page that can be set to a particular city and other interests. For lower elementary grade levels or for saving time the teacher can set up the favorites page for students to easily access the weather for particular cities. Upper elementary grade level students can set up their own favorites page. Also, the teacher can set the web page preferences to have data reported in the metric system. The data retrieved from this tool, Weather Underground, can be incorporated in science lessons. Mathematics is integrated in the lesson as well by having students display the data in tables and graphs and make comparisons among hours, days, or cities. Students then use engineering practices of analyzing and interpreting data in the tables to construct explanations of the current weather and make weather predictions. Weather Underground is a student-friendly, easily accessible weather information site that allows students to obtain weather variables in cities worldwide that could efficiently be incorporated in STEM lessons.

Data from Weather Underground can be used to create interdisciplinary lessons in STEM as well as other subject areas. An example for mathematics would be using Weather Underground to collect high and low temperatures for two cities for five consecutive days. With this data students can make a table and graph representing the data and then can interpret what the graph represents. Instead of creating the table and graph by hand, by integrating technology, students can create a table and graph using a spreadsheet. Then students can use the data from the five consecutive days to calculate the mean, median, mode, and range for each weather variable. In addition data integration can be incorporated in language arts. Students can communicate weather variables by writing an article or narrative story on how weather affects many aspects of our lives like health, sporting events, outdoor activities, clothing choice, travel, wildlife, and agriculture. Weather information is versatile and can be integrated in many disciplines.

Data provides evidence of what’s occurring in the natural world. It’s important for students to interact with actual evidence to really understand the concept studied. By looking at patterns and relationships students can begin to make their own conclusions about scientific concepts. Data both collected by the students during an investigation and collected from another source such as a website helps students analyze and interpret the

concepts, in this case the constantly changing weather variables. Data integration adds to student learning by having them explore other data sources and make comparisons. Analyzing, interpreting and comparing weather information also allows students to make real life connections to help understand the big idea such as the relationship of local weather to the activities in the Earth's atmosphere. Integrating data in science lessons is valuable. Useful data can help students make conclusions about scientific principles or processes. Analyzing real life data aids in a better understanding of the world around us.

References

“Investigation 3: Earth's Atmosphere.” *Earth and Sun: Investigations Guide*, Delta Education, 2016, pp. 231–284.

“Weather Forecast & Reports - Long Range & Local.” *Weather Underground*, www.wunderground.com/.