Nature of Science and Math: Analyzing the Presence in Everyday Communications

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Several tenets from Nature of Science and Common Core Mathematics Practices are embedded in the USA Today article "Hurricane Matthew: Here are scenarios for the USA." The writer uses science and math practices to provide evidence to the reader of the possible forecast scenarios for Hurricane Matthew so that the people who could be affected will be prepared and take the necessary safety precautions.

Scientific Knowledge is Open to Revision in Light of New Evidence

One theme that is presented in the USA Today article is that scientific knowledge can be reconsidered when new information is identified. The article states, "There is basically two extremely wide-ranging scenarios in the U.S. for Matthew after it batters the Caribbean." (Rice, 2016) This statement shows with the data available to meteorologists at the time there was not just one possible path for the hurricane. As the forecast models showed the movement of the hurricane, many factors such as timing, strength of weather systems, and upper-level high and low pressure areas affected its movement making it difficult to "pin down" (Rice, 2016) how close it would come to the East coast. The movement of the hurricane can change which influences the data the meteorologists have available to review, and therefore meteorologists can only provide the possibilities of when the hurricane may hit. With the constant changing of new information scientists revise their explanations of a certain subject or situation, in this case Hurricane Matthew. Meteorologists continually change their reporting to the public as they receive new evidence.

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

Another principle that was included in the article was three models to show different views of Hurricane Matthew. The pictures are used to provide evidence to the reader how and where the hurricane could possibly affect certain U.S. regions. There is a view from space of Hurricane Matthew, a computer model from the National Weather Service's Global Forecast System (American model) showing predictions for a one to five day range, and a grid from European Center for Medium-Range Weather Forecast (European model) showing tracking trends of the hurricane during a period of time. The American and European forecast models are both used to help make predictions of the movement of the hurricane. With the help of these models meteorologists can explain how the hurricane can affect specific geographical areas.

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
Scientists assume many patterns in natural systems and laws of nature are consistent. Having observed patterns of what happened with past hurricanes can help scientists predict the possible paths of current storms. These assumptions about the path of the hurricane help meteorologists give warning to the public of the possibility of hurricane conditions for the east coast of Florida in the next 48 hours as stated in the USA Today article.

Model with mathematics
The practice of modeling with mathematics was used to help predict the path of the hurricane. Two forecast computer models referenced in the article, European Center for Medium-Range Weather Forecast (ECMWF) and National Weather Service's Global Forecast System (GPS), are constructed from "mathematical equations based on physics that characterize how the air moves and heat and moisture are exchanged in the atmosphere." (Durbin 2018) These two models collect data and the assimilated data is analyzed on a grid to track the upcoming path of weather systems such as a hurricane.

Construct viable arguments and critique the reasoning of others
The USA Today article states that the American weather model shows the scenario of the hurricane moving a little closer to the East coast whereas the European weather model shows the hurricane "over or near the coast." (Rice, 2016) Knowing the strength and breadth of the hurricane by using both American and European models, meteorologist Robert Henson communicates a warning to coastal residents from Florida to Canada that they might be impacted by the hurricane in the upcoming days. Henson uses the information he has at the time to make these assumptions, showing the use of the mathematical practice of constructing viable arguments and critiquing the reasoning of others.

Use appropriate tools strategically
Two grids, one GPS (American model) and the other ECMWF (European model), were pictured in the USA Today article to show Hurricane Matthew's possible path for a period of time. These two technological tools were appropriate tools used to interpret the information from math equations and analyze the assimilated data to help scientists make predictions for the hurricane's track.

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