Nature of Science & Math

In Everyday Communication

Maureen Miller

Nature of Science & Math: Analyzing the Presence in Everyday Communication

Abstract

This paper analyzes an online article about adhering to the tenets of Nature of Science and the practices in Common Core Mathematics. The three tenets that will be discussed are: Scientific Investigations Use a Variety of Methods, Scientific Knowledge is Open to Revision in Light of New Evidence, and Scientific Knowledge Assumes an Order and Consistency in Natural Systems. For the Common Core Mathematics Practices, the three areas selected are: Reason Abstractly and Quantitatively, Use Appropriate Tools Strategically, and Attend to Precision.

Scientific Investigations Use a Variety of Methods

The article states that the scientists are assessing the volcanos using geophysical monitoring techniques. Radar is being used to measure the height of ash plumes emitted from Kilauea. Wind speed is measured to predict how far the ash could be scattered across the island. The scientists measured the amount and composition of the gases released from Kilauea in addition to ground displacement from gas build up. These factors mentioned in the article provide evidence that the scientists adhered to the tenet. A variety of methods, tools, and technologies were employed to obtain accurate, up-to-minute information about the volcano. The article also makes connections between data and observations when it stated, “Plume heights are an effect of how much heat energy is released and the explosion’s intensity.”

Scientific Knowledge is Open to Revision in Light of New Evidence

Yan’s article references that scientists have been aware that Kilauea has been continuously erupting since 1983. The authors referenced to how new technology has enhanced scientific knowledge when they wrote, “they can now gather and study an unprecedented volume of data.” Development of new technologies have permitted the scientists to measure ground movement, gas volume and composition. This new information allows the scientists to forecast more accurate predictions that can potentially save lives.

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

The article indicated that Kilauea’s activity has been under observation for nearly a century. Observations have been recorded over this period as it relates to steam explosions and lava flow. As new technologies were developed, addition data could be collected beyond just observations. The scientists reference to correlating information such as plume height and energy released,

wind patterns and ash distribution, and gas emission and magma collecting. As they analyze the data, the scientists applied patterns evident in natural systems to establish connections between data and observations. As they review past observations they can make predictions of previous data that was not able to be collected due to limited technology. This analysis of data permits scientist to forecast events. "It also helps scientists understand past lava flows, anticipate what could occur next, and pinpoint signs or patterns before an eruption." These statements indicate that the article is complying with the tenet.

Reason Abstractly and Quantitatively

The scientists on Kilauea employ radar technology to measure the height of the ash released. With the radar system they can now measure the height at night as well, thus providing more data. Because the height attained has a direct relationship to the amount of energy released, as per Newton's Third Law of Motion, they can calculate the intensity of the explosion.

Use Appropriate Tools Strategically

The article references to the variety of measuring tools employed by the scientists on the island. Such tools are: thermometers, wind speed gauges, gas spectrometry, and satellite imagery. Because the scientists can utilize a variety of tools to produce a vast amount of data that then can be correlated, they are adhering to this mathematical practice.

Attend to Precision

In the article Michael Poland, a U.S. Geological Survey volcanologist states, "You're sort of zeroing in on finer and finer levels of detail into how the volcano works." This statement implies that the scientists analyzing the volcanic eruptions of Kilauea are following the mathematical practice of precision regarding units of measure. These same scientists must relay their

information to the governing authorities regarding the safety of the inhabitants, thus they must be able to accurately convey their reasoning.

Reference

Yan, Sophia, and Malcolm Ritter. “Hawaii Volcano Gives Experts Clues to Boost Science.” *U.S. News & World Report*, U.S. News & World Report, 7 June 2018, www.usnews.com/news/news/articles/2018-06-07/hawaii-volcano-gives-experts-clues-to-boost-science.