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

This paper reviews the article We're at the Peak of the Global Fire Season by Meko and Karklis, 2019, posted on-line from the Washington Post. The article details the recent events taking place in the Amazon as well as a brief analysis of fires around the world. The article looks to point out that although the fires in the Amazon are alarming, "not all fires are the same" (Meko & Karklis, 2019) and other regions of the world have higher rates of wildfires. This paper will analyze how the article meets the following three tenants of the Nature of Science: 1) scientific knowledge is based on empirical evidence, 2) science models, laws, mechanisms, and theories explain natural phenomena, and 3) science address questions about the natural and material world. This paper will all discuss how the article meets the following three math practices: 1) making sense of problems and persevering in solving them, 2) using appropriate tools strategically, and 3) modeling with mathematics.

Part A: Tenets of Nature of Science

When analyzing the article, Meko and Karklis (2019) discuss how the current fires in the Amazon are large and many, there are several regions of the world that also have intense fire seasons. They state these fires are driven by various environmental events such as dry periods, agricultural practices, and the spread of human population (Meko & Karklis, 2019). This statement regarding the frequency, number, and factors behind other fires, meets the tenet of the nature of science, that scientific knowledge is based on empirical evidence. If one assumes that to make this statement, scientist have been looking at the patterns over time using observations to make the correlation between the mentioned environmental factors and the occurrence of fires.

Scientist have then used the patterns to make a connection that explains the relationship between events such as dry periods and agricultural practices to the occurrence of fires. This is then an example of scientist using patterns over time to base their findings ("Next Generation Science Standards", 2019).

The authors also discuss how special imaging is used by NASA to record all of the fires around the world. This data has been collected for the last 19 years. Scientist have taken the data and mapped each fire allowing a "clear geographic and temporal pattern" (Meko & Karklis, 2019) to emerge. Here they are showing that scientist use models to explain natural phenomena as well as using patterns to find a cause and effect relationship ("Next Generation Science Standards", 2019). The use of imaging to create a model allows the data to be interpreted to produce evidence that there is a correlation between the fire events and key contributing factors.

The last tenet, is that science address questions about the natural and material world. Science may address questions but not all of these can be answered ("Next Generation Science Standards", 2019). As technology evolves it is possible that new questions can be answered and current thinking on a matter may be revised. The authors discuss how although fires have been on the rise, they cannot claim that this will continue to a level that surpasses the norm for this part of the world. This shows that science cannot always answer all questions, but that it takes further observations of patterns to make those predictions.

Part B: Common Core Math Practices

The math practices of making sense of problems and persevering in solving them by using appropriate tools strategically are both meet in the article. The common core math practices states that students who are proficient in the practice of making sense of problems can translate certain problems into graphs and tables to better understand the solution while the

practice of using appropriate tools includes understanding that technology aides in the visualization process (Standards for Mathematical Practice, n.d.) The data in this case, is over 75 million fires across the globe that had been collected and used by the NASA Moderate Resolution Imaging Spectroradiometer to create maps and graphs. By using this model, scientist are able to make sense of the data by allowing them to see patterns and correlations between the time of year, geographic location, and clusters of fires across the world. This is an example of how scientist use both of these math practices to better understand information they have recorded over time. What is not seen or explicit in the article are the algorithms they would have used to create such programs for their data analysis.

The math practice of looking for and making use of structure is met in the article in the explanation of how scientist plotted the data and then could determine that fires were on an upward trajectory and possibly on track to outpace other years. The scientist at NASA used their tools and skills to discern the patterns and their meanings.

Conclusion

In conclusion, the article touches on the tenets of the nature of science but they are not explicit. The information could be better understood if they did explain the nature of science and the fact that ideas about fire have changed in both a positive and negative way. The math practices are also very hard to detect yet one can make the case that they are there since the scientist at NASA and the author of the article had to arrive at their conclusions with their use.

References

(2019, July 11). Next Generation Science Standards. Retrieved from
     https://www.nextgenscience.org/

Meko, T., & Karklis, L. (2019, August 30). We're at the peak of the global fire season. Retrieved
     from
     https://www.washingtonpost.com/climate-environment/2019/08/30/were-peak-global-fire
     -season/

(n.d.). Standards for Mathematical Practice. Retrieved from
     http://www.corestandards.org/Math/Practice/