

## Finding the Presence of the Nature of Science and Math in a USA Today Article

To an everyday reader of science news, the Nature of Science or Math will not be at the forefront of their minds. As a new student of STEM, I have become aware of scientific tenets and have started to look for proper usage. The article I have chosen, titled "Pluto has 'ice dunes' and 'Earth-like characteristics'" written by Doyle Rice, was found on USA Today's online media source. I first came across this article about Pluto on Science Magazine's online site, Sciencemag.org, but I felt I needed a report from a more widely known media outlet. I turned to USA Today's website, and much to my surprise, I found an article written about the one I had just perused. The USA Today offering is not as lengthy as Sciencemag.org's article, which made me want to shy away, but I was surprisingly able to find evidence of the tenets and practices with which I was charged. This finding taught me that size does not matter; it is the content that is most important.

### **Evidence within the NGSS**

#### **Scientific Investigations Use a Variety of Methods**

According to the USA Today article, NASA's New Horizons space telescope flew by and took photos of the surface of Pluto in July of 2015 (Rice, 2018). Scientists are using this technology to advance our knowledge and understanding of Pluto's surface. Rice interviewed the study's author, Matt Telfer from the University of Plymouth, Great Britain, who stated, "we knew that every solar system body with an atmosphere and a solid rocky surface has dunes on it, but we didn't know what we'd find on Pluto" (Rice, 2018). Within this category of the NGSS Matrix, under the High School heading, it states, "new technologies advance scientific knowledge," and "scientific investigations use a variety of methods, tools, and techniques to revise and produce new knowledge" (Next Generation Science Standards [NGSS], 2013). Using New Horizons as a tool, scientists are gaining new insight into Pluto's mysteries and revising their thinking of this dwarf planet.

#### **Scientific Knowledge is Based on Empirical Evidence**

This category of the NGSS Matrix, under the Kindergarten through second-grade column states, "scientists look for patterns and order when making observations about the world," and the High School column states, "science knowledge is based on empirical evidence" (NGSS, 2013). Using new information about Pluto and their knowledge of our Earth, scientists find "Earth-like characteristics" on Pluto such as, "...mountains, glaciers, and ice moving" (Rice, 2018). Scientists can use observations about our world to make sense of what they see on Pluto (NGSS, 2013).

#### **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

Pluto has ice (methane), mountains, winds that develop dunes of ice particles, glaciers: all natural happenings on Earth (Rice, 2018). We also know Mars has some of the same natural occurrences such as mountains and ice. According to the NGSS Matrix, "science assumes the universe is a vast single system in which basic laws are consistent," and "...assumes consistent

patterns in natural systems" (NGSS, 2013). The USA Today article states, "understanding how dunes form on Pluto will help scientists study similar features found elsewhere in the solar system" (Rice, 2018). The Nature of Science tells us there are order and consistency in the universe. The findings from the New Horizons space telescope gives us evidence of this specific understanding.

### **Evidence within the CCMP**

#### **Model with Mathematics**

The article states winds created dunes of ice, "...estimated at 12 to 18 mph" (Rice, 2018). To determine wind speed, scientists likely used a known formula to estimate the wind on Pluto. The CCMP tells us, "mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace" (Common Core State Standards [CCSS], 2018).

#### **Use Appropriate Tools Strategically**

The study's co-author Jani Radebaugh states Pluto is, "30 times further away from the sun as the Earth" (Rice, 2018). "Mathematically proficient students consider the available tools when solving a mathematical problem" (CCSS, 2018). Scientists likely use a type of computer-based algebra or geometry software to precisely obtain such vast distances.

#### **Construct Viable Arguments and Critique the Reasoning of Others**

The article states, "the dunes were likely formed within the last 500,000 years and possibly much more recently" (Rice, 2018). It is hard to stand on a concrete date for which the planets formed. For scientists to know when the dunes of Pluto formed would be an assumption. The CCMP says, "mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments." as well as "...listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments" (CCSS, 2018). Surely this practice will be used by scientists quite a bit to be more precise.

#### **Resources**

Common Core State Standards. (2018). Standards for mathematical practice. Retrieved from <http://www.corestandards.org/Math/Practice/>

NGSS Lead States. (2013). Next generation science standards: For states, by states (Understandings about the nature of science). Retrieved from <http://www.nextgenscience.org/sites/default/files/Appendix H - The Nature of Science in the Next Generation Science Standards 4.15.13.pdf>

Rice, D. (2018, May 31). Pluto has 'ice dunes' and 'earth-like characteristics'. USA Today. Retrieved from

<https://www.usatoday.com/story/news/2018/05/31/pluto-has-ice-dunes-and-earth-like-characteristics/660562002/>