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

Cassandra Whitehead

Children's Kiva Elementary School

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Nature of Science

In the article “In Coral Skeletons, Microscopic Portraits of Resilience” many tenets of science are used. I will be focusing on: Scientific knowledge is open to revision in light of new evidence, scientific knowledge is based on empirical evidence, and Science models, laws, mechanisms, and theories explain natural phenomena.

Scientific Knowledge is Open to Revision in Light of New Evidence

According to the article “coral may be more robust in the face of human-driven ocean acidification than commonly thought (Yin, 2017).” This statement shows that in the past it was thought that acidification of the ocean would affect the growth of coral but that new evidence shows that it may not. This article shows that new evidence was found and is changing the thoughts scientists have had on the impact humans have on coral. This new finding came about because of study on coral and how it reacts to acidification. The article showed that evidence can change scientific knowledge.

Scientific Knowledge is Based on Empirical Evidence

Coral is created by a process called calcification. There are two parts to calcification that scientists have looked at. The one view that scientists have on how calcification works has to do with “chemical interactions with seawater (Yin, 2017).” These interactions make it possible for coral to create calcium carbonite which is what their skeletons are made of. The acidity of the water could make it impossible for coral to create the calcium carbonate that they need to create their skeletons. The other view thinks that calcification is a “biological process (Yin, 2017),” which is much like how our teeth and bones form. This view provides evidence that coral may not be as affected by acidity in the ocean water as we thought previously. Scientists, in this case,

used patterns and tools to help them to determine their new findings. The scientists who conducted this study used an ultra-violet microscope to observe molecules on some smooth cauliflower coral. They found that the coral started with amorphous calcium carbonite that is formed through proteins. This process was also found to happen with sea urchins and shellfish, which helped to show that “amorphous calcium carbonite may be a common precursor for calcification (Yin, 2017).” This pattern helped Dr. Falkowski show that coral may not be as fragile as we have thought. This article showed, barely, that evidence was found. The evidence was stated in a bare bones way so that the general public could read and understand the article.

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

In this study scientists started with a cause and effect as well as a question. That question was whether or not the acidity of the ocean would affect our coral reefs. The question was based on observations that were made or a cause and effect that was observed. Scientists were then able to take their question and observations and come up with a theory. That theory is that coral is not as sensitive to acidity as we thought. Steph Yin, the author of this article, showed that the scientists used previous knowledge to come up with their theory and it helps to explain a natural phenomenon. (Yin, 2017)

Nature of Math

This article also has some practices from the Common Core Math Standards. I will be focusing on: make sense of problems and persevere in solving them, construct viable arguments and critique the reasoning of others, and use appropriate tools strategically.

Make Sense of Problems and Persevere in Solving Them

The scientists who were studying the coral in the article “In Coral Skeletons, Microscopic Portraits of Resilience” had a problem they needed to solve. They needed to know whether the

acidity of the ocean would harm coral. In order to solve this problem, they had to conduct many tests and make sense of the problem at hand. They also had to persevere until they had an answer. They used the above math practice to show that coral may be more resilient than previously thought.

Construct Viable Arguments and Critique the Reasoning of Others

Using tests and observations, such as watching coral grow, helped Falkowski and his collogues construct the argument that coral may be able to withstand more acidity than was previously thought. The amorphous calcium carbonate was shown to form using proteins which are less likely to be affected by acidity. Falkowski had to critique others' thoughts in order to come to his conclusion and his conclusion also had to withstand critique from others. Not all scientists agree with his study.

Use Appropriate Tools Strategically

Falkowski and his team used an ultrahigh-resolution microscope to capture images of coral forming a skeleton. They discovered through tests that even when subjected to high amounts of acidity coral was able to form skeletons. The acid did affect the loss of skeleton, but not the growth. The microscope used gave the scientists images that helped to show that coral skeletons are formed with proteins. This shows that these scientists used appropriate tools to help them to study the corals growth. (Yin, 2017)

Conclusion

In the article "In Coral Skeletons, Microscopic Portraits of Resilience" the author did a fair job of representing the nature of science and math. It was written to be accessible to the general public, so it lacked the depth of a scientific paper, but it gave a good representation of both tenets and practices of science and math.

References

Yin, S. (2017, June 1). In Coral Skeletons, Microscopic Portraits of Resilience. *The New York Times*. Retrieved June 8, 2018, from https://www.nytimes.com/2017/06/01/science/coral-skeletons-ocean-acidification.html?ribbon-ad-idx=8&rref=science&module=Ribbon&version=context®ion=Header&action=click&contentCollection=Science&pgtype=article