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ANALYSIS

Nature of Science (NOS) and Common Core Mathematics Practice (CCMP) Article Analysis
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In “Krill can digest ocean plastics: 'That is certainly not good news at all’” from
DW.com published on September 3, 2018, a researcher from the University of Technology in

Sydney, Australia studied how krill will eat microplastics mixed with plankton. This article identifies with several tenets in the Nature of Science (NOS) such as: Science Addresses Questions About the Natural and Material World, Science is a Human Endeavor, and Scientific Knowledge is Open to Revision in Light of New Evidence. This article also addresses several Common Core Mathematical Practices (CCMP) such as: Use appropriate tools strategically, Look for and make use of structure, and Attend to precision.

In performing this study in a laboratory setting, the scientists showed how “Science limits its explanations to systems that lend themselves to observation and empirical evidence” (The Nature of Science, 2013). Using the matrix of “Nature of Science understandings most closely associated with Crosscutting Concepts” this methodology of research pertains how “Science Addresses Questions About the Natural and Material World” (The Nature of Science, 2013).

When the krill are fed the microplastics, they digest those microplastics and “convert the microplastics into nanoplastics” (Hanel, 2018). The study showed how these nanoparticles were found in the tissues of the krill. In the CCMP, this identifies with the standard, “Attend to precision, MP6” to “calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context” (Standard for Mathematical, 2019).

The “groundbreaking” finding in this article is that “Feeding studies in the past have thought that the plastic just passes through, and is excreted or just translocated through organs” (Hanel, 2018). Because of this study, scientists now know that is it not passed through and is digested. This new discovery shows how in the Nature of Science “Scientific

explanations are subject to revision and improvement in light of new evidence” and “Science findings are frequently revised and/or reinterpreted based on new evidence” as shown in the category of “Scientific Knowledge is Open to Revision in Light of New Evidence” (The Nature of Science, 2013). Since previous studies have been done surrounding this topic, this new information is adding to the “body of knowledge” and that “science knowledge is cumulative” as stated in the Nature of Science understandings most closely associated with Crosscutting Concepts, “Science is a way of knowing” (The Nature of Science, 2013).

The scientists were able to “develop an algorithm to measure the nanoparticles of plastic all throughout their bodies” (Hanel, 2018). In the Common Core State Standards for Mathematics for grades 6–8, students “modeling with mathematics typically means representing and/or solving a one-step or multi-step word problem, possibly one in which certain assumptions necessary to formulate the problem mathematically are not specified for the student.” (Appendix 1, 2013). This algorithm will give them additional information on the statistics and probability such as likely outcomes, outliers, and trend lines. The creation of the algorithm also pertains to CCMP, MP5, Use appropriate tools strategically by using technology that is useful and as a relevant resource (Standards for Mathematical, 2019).

The krill “do excrete some of those fragmented microplastics, but they also do end up [staying] inside the krills' bodies and their organs” (Hanel, 2018). The krill are then being fragmented as well which could lead to other organisms eating the krill and then humans. The scientist, Willa Huston, was careful to point out that there is “no evidence” (Hanel, 2018) that humans are then getting these plastics in their tissues. The study shows that this is a possibility. But this is not something they researched. In “What’s in a Word?” Renee

Schwartz address misconceptions such as “science is absolute” (Schwartz 2007). People could read this study and assume that the nanoplastics are then in human tissues. Schwartz cautions in asking, “what proof do you have?” The scientist would say, “there is no evidence.” There would need to be another experiment to support a new hypothesis.

The Nature of Science, Science is a human endeavor, explains how scientists work in teams and rely on persistence, logic, and reasoning. Scientists use advances in technology to further their research and likewise their research can create technology. The article featured information from a study that was co-authored by Willa Huston, and consistently refers to “we” as her team persisted through this endeavor using logic, reasoning and technology.

References

APPENDIX L – Connections to the Common Core State Standards for Mathematics 1.

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