

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

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The New York Times article, “In Coral Skeletons, Microscopic Portraits of Resilience?”, by Steph Yin, is a clear representation of the seamless connections between the Nature of Science and the Nature of Mathematics in everyday communication. Through the context of coral calcification in an increasingly acidic ocean environment, we can understand how math and science are used simultaneously to explore and make sense of the natural world. Within the content of Yin’s reporting, and embedded links to primary data, the reader is left with the appreciation of how dependent math and science are on one another.

Below are 3 tenets of the Nature of Science and 3 practices of Common Core Mathematics that are met in this article by Steph Yin:

Scientific Knowledge is Based on Empirical Evidence: Dr. Falkowski, Rutgers University Professor, and lead author of this study, along with colleagues, used ultrahigh-resolution microscopic imaging to make accurate observations of the skeletal branches of smooth cauliflower coral at the molecular level.

Scientific Knowledge is Open to Revision in Light of New Evidence: “We have a lot of data to show many coral species are very sensitive to environmental change,” said scientist Alexander Venn. It has been widely believed that as the oceans acidify from the increasing amount of carbon dioxide in atmosphere, that the process of coral calcification will be negatively affected. New scientific findings and data collected by Dr.

Falkowski's team is suggesting that this belief made need to be revisited and that coral may be more resilient than scientist originally thought.

Science Models, Laws, Mechanisms, and Theories Explain Natural

Phenomena: After the reviewing Dr. Falkowski's research, assistant professor of oceanography, Alex Gagnon, suggests that more research must be done and we mustn't forget the cause and effect relationship we already know to be true in science, "acid dissolves calcium carbonate, so the more acidic the ocean is, the more difficult it is for corals to organize that first bit of skeleton. At the end of the day, the fundamental rules of chemistry and physics still apply."

Construct Viable Arguments and Critique the Reasoning of Others:

Dr. Falkowski has gathered enough data about the process by which coral's skeletons grow, that he and his team are able to construct a viable argument that counters the existing scientific belief about the effect of ocean acidification on coral calcification. Dr. Falkowski's team can justify and communicate their conclusions based on the analysis of their data.

Model with Mathematics: Coral reefs are massive and can be seen from space. The empirical data from satellite photos of coral reefs over time can create models that inform scientists of the changing size and therefore changing health of coral reefs.

Use Appropriate Tools Strategically: Scientists need to employ the appropriate math tools to create models that help to simplify the complicated data that are necessary to consider when studying the health of coral reefs. Data on the pH of ocean water and CO₂ levels over time, helped to create projections of ocean warming and acidification. This allowed scientists to visualize the data in a variety of ways that could then be

compared, to explore consequences, and make predictions about the wellbeing of the biological processes of coral.

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