

Nature of Science

Part A:

The article talks about the changes that occur to the coral reef specially when the water's acid level changes. The paper reflects on three tenets: scientific investigations use a variety of methods, scientific knowledge is open to revision considering new evidence, and scientific knowledge is based on empirical evidence.

For the first one, scientists used the scientific method on the coral reef to figure out how the coral reef itself forms. They knew corals went through a process called calcification but didn't know how to prove the actual process. This is like the purpose/question from the scientific method. They then decided to use their knowledge and ran multiple tests by "using ion pumps" to "decrease the acidity of seawater to have calcium carbonate form spontaneously" (Yin 1). Afterwards they increase the acidity to see if the coral itself can still form its skeleton. This part would be the steps of experiment from the scientific method. The experiment itself with the independent variable being the acidity and the dependent variable being the coral's ability to form a skeleton. A constant variable would be the water temperature and the same type of coral.

For the second tenet, the coral's process of calcification has been debated for decades. Different scientists form new ideas over the topic and consistently tried to support their hypothesis. A recent discovery was added that coral as a "protein similar to the ones that help us make our teeth and bones" (Yin 1). Scientist take into consideration the findings from others to find a solution to the problem they are trying to solve. Although, they do take into consideration of human error, they will always have time to double check and revise their findings if a significant amount of evidence is brought forward.

Finally, for the last tenet, different experiments are done to support their hypothesis to lead to a final solution but not the actual one. As professor Falkowski stated, the coral is alive, and Ms. Allison stated that the "report of amorphous calcium carbonate in coral" is one of the first to prove his hypothesis that coral can control how much solid material can be deposit (Yin 1). Scientist attempt to do many experiments with different factors to make sure that the findings they present are the most accurate. When presenting information to a committee, they put their reputation on the line. This means that scientist will do multiple tests to make sure the evidence gathered will support their main hypothesis.

Part B:

The article meets three practices from the common core mathematics practices: construct viable arguments and critique the reasoning of others, use appropriate tools strategically, and look for and make use of structure.

For the first practice, Mr. Falkowski argued that the coral is alive and that even if the acidity of the ocean changes, the coral would still produce it's skeleton but of course not everyone agreed. The other party, Mr. Venn stated that "the problem is they have lots of data that show many coral species are very sensitive to environmental change" (Yin). Even though both have valid agreements, they can critique each other's reasonings. This is important because scientist can view many factors involved instead of believing the findings for one hypothesis.

When scientist argue over their findings, they are able to compare and contrast to help them lead into the main goal of finding a solution to both their hypothesis and the study of coral.

For the second practice, the scientist used different test methods and tools to prove their own theories. One team used an ultrahigh-resolution microscopic imaging to see the structure of the coral which leads to the third practice. It's important to plan out which instruments to use on a specimen so no time is wasted and that their findings can be found most accurate. The scientist could have used a regular microscope, but they didn't because they wanted to see exactly what the coral structure was creating. By using that specific microscope, they were able to see the exact structure and study the different amounts of calcium carbonate being produced. The structure plays a main role because it helps scientist know how durable the coral has become. Just like in math, a rectangular prism would be much stronger than a simple rectangle. This helped with their findings overall to support their hypothesis and see if the effects of acid in the seawater would stop the coral from secreting calcium carbonate or instead make it secrete spontaneously.

Works Cited:

Yin, S. (2017, June 1). In Coral Skeletons, Microscopic Portraits of Resilience? Retrieved September 15, 2018, from <https://www.nytimes.com/2017/06/01/science/coral-skeletons-ocean-acidification.html?ribbonadidx=8&rref=science&module=Ribbon&version=context@ion=Header&action=click&contentCollection=Science&pgtype=article>