

Nature of Science

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The Primary focus of my “Nature of” exploration is the Nature of Science. I chose this focus as I have been teaching science classes for 6 years and have little experience in the other “Nature of’s” In my classroom, the tentative nature of science is not something that I directly address. Because I don’t really “teach” content very often, there hasn’t a clear place for me to incorporate this into the curriculum. Empirical evidence and creativity are two of the tenets that we address as a natural part of the Science Research curriculum, and part of why I love my job so much. Each student chooses a project of interest and researches how best to answer their research question (within the constraints of safety and cost). I typically have students that want to work on human disease and I enjoy watching them research model organisms and figure out what creative alternatives they can come up with. I never discuss the subjectivity of interpretation, social or cultural issues. Clearly I have work to do!

In my teaching, I will try to build a core curriculum for the new Introduction to Science Research course that I will be teaching this year. The course is by nature, cross-curricular regarding content areas. For example, I am planning to do a biodiversity study for our local wildlife refuge. This will be a quarter-long project that will span many years using transects, identifying and counting organisms. This research project will envelope Biology (morphological identification), Chemistry & Biochemistry (DNA extractions and PCR), so the Science Part is clearly covered. As excited as I am about this project, this study could be enhanced addressing technology and engineering.

Technology could be incorporated into this study through use of ARC-GIS. Our district has a license for ESRI which is a “GIS Mapping Software, Location Intelligence and Spatial analytics technology.” Perhaps we could use this to integrate Technology into the biodiversity study by allowing students to build ARCGIS maps showing which species are present at each site of the study. To incorporate Math, I could have the students do simple calculations (% population prevalence) as well as more complicated statistics. I have just started incorporating DataClassroom resources into my AP Research-STEM curriculum. The Introduction to Science

Research classes could use DataClassroom to calculate statistical differences among numbers of species/numbers of individuals in different quadrants at the wildlife refuge.

Upon reading the document, *Standards for Technological Literacy*, there are a number of ways that the Nature of Science and the Nature of Technology overlap. Like science, technology can be tentative. Similar to the Nature of Science, which states that science is tentative and there is not always a “proven” correct answer, the Nature of Technology states that “Changes caused by the use of technology can range from gradual to rapid and from subtle to obvious. (Standards for Technological Literacy, Third Ed, p62) As scientific theories can be revisited and revised based on new evidence, technology continues to evolve and grow based on new achievements.

The Nature of Science requires awareness of culture and society, and is affected by those facets as well. When we teach science we have to keep those things at the forefront of curriculum planning and delivery. The same holds true for the Nature of Technology. Technological advances can both affect and be affected by the society in which they are developed, and around the globe. One society may be equipped for a new technological advancement, while others may be culturally unprepared. In advancements in science and technology, care must be taken to consider societal impacts in the environments in which the advancements are made, as well as globally.

A third similarity between the Nature of Science and the Nature of Technology is the requirement for empirical evidence. Collecting empirical data in a scientific advancement is the basis for all analysis and conclusions. In Technology, new designs must be evaluated using empirical data to assess the success of the new technology. Students must “test and evaluate the design in relation to pre-established requirements” (Standards for Technological Literacy, Third Ed, p121)