

a) Reflection of how I address the tenet(s) currently in my teaching.

I use all the [tenets of the Nature of Science](#) in my classroom and with my teaching. I feel this comes naturally with good teaching. It's common practice for me to remind my students that there are many ways we can all investigate our world and ask questions to understand what we observe. When I taught 7th grade science, I would start off the year by asking my students to draw a scientist. I didn't elaborate at all. The only directions were to *draw a scientist*. I did this for several reasons. Among them was to uncover misconceptions about what science is and what scientists do. As expected, most students drew a "mad scientist" in a lab doing some kind of chemistry experiment. The results of this assignment lead to many good discussions about what science is, all the different fields of science, all the jobs people do that include doing science, etc. Through these discussions, students learned how science is all around them all the time. Sometime later in the school year, I would ask my students to draw themselves doing science. I recall many excellent depictions, including one where a student drew himself sitting on the branch of a tree watching birds. Another student drew herself in the kitchen, following a recipe to bake a cake.

The two tenets: "Science is a Way of Knowing" and "Science is Human Endeavor" resonate with me most because of who I am as a teacher and a scientist. I have a set of posters* hanging in my classroom that display the tenets of science really well. Each has one word, one image, and a quote. Some of the words are Knowledge, Endeavor, Discover, and Question. The pictures are simple and eye catching. For example, a microscope, a large green apple, a footstep on the moon. The quotes are ones from well known people in history such as Einstein and Aristotle. I point out these posters to my student throughout the year, as a reminder that we are all scientists and we all do things like, observe, investigate, question, and seek understanding.

*I have looked all over the Internet for these posters and I can't find them! I forgot who published them. Perhaps it was NASA. I look forward to getting back in my classroom to find this information about the posters.

b) How I might enhance my teaching to address the tenet(s) and how my thinking/ understanding of the NOS is dynamic.

I liked doing the “draw a scientist” activity with my 7th graders. Perhaps I will do that with my 6th graders this coming school year. It’ll be a good way to get my students seeing that science is all around them. I always encourage my students to ask questions and record those questions in their science journals. I don’t always give them enough time to do this, however, and I often don’t go back and look at all their questions. I plan to improve on this in coming years. My hope is that I will encourage my students to revisit their questions and come up with sub-questions that can lend themselves to possible investigations. One of my goals as a science teacher is to use science journals more often in my classes.

Science is a way of knowing used by many people, not just scientists, from “Science is a Way of Knowing” is a good reminder for all teachers. For those students who think they are not good at science, or say they don’t like science and they’re never going to have a job in a field of science, this facet of the nature of science reminds us all that science happens all around us and you use science skills even when you don’t realize it. The processes and practices we use in our classrooms, such as making observations and inferences, thinking critically, and problem solving, are skills that are needed in many areas of a student’s school career and future jobs.

One thing I do at the beginning of every school year is have my students make posters of the science processes and skills in verb form (observe, infer, use data, hypothesize, use models, investigate, etc.) and I hang them up around the top part of the walls of my classroom, and they stay there all year. I also have my students write these words on the front cover of their science journals. They can choose five or more of the words and add pictures too. I remind them all year that they are using those skills and practices, but I don’t elaborate much. Something I would like to do this year, to enhance my teaching of the tenets of the Nature of Science, is to have the students reflect on their use of these skills. Once a month, or at the end of a unit, or an investigation, I could have my students write a reflection on which of the skills they used and how they used them.

c) Identify 3 ways in which my content area overlaps with a second area of the “nature of..”

There is lots of overlap between the areas of science, technology, engineering, and math. Two of the NGSS Science and Engineering Practices involve mathematics practices: Analyzing and Interpreting Data and Using Mathematics and Computational Thinking. The [Common Core State Standards for Mathematics](#) explain how math and science are related in good teaching.

Three ways math overlaps with science in my classroom are 1) calculating speed using the speed formula, 2) graphing temperature data, and 3) using tools for measurement.

Most experiments I do, in my sixth grade science classroom, involve collecting data of some sort. This ranges from temperature readings from thermometers, to using stopwatches to record the time it takes a toy car to get to a finish line. When analyzing data, I need to take into consideration what my students have learned and are able to do, with regards to the math involved.

During both the thermal energy unit and the weather unit, many labs include students having to read and record temperatures. They then need to analyze the data. To aid in the understanding of the data, they might, for example, find the difference between starting and ending temperatures, or make a line graph of the data to see change over time. During the forces & motion unit, students will measure distance with meter sticks and measuring tapes, and record time with a stopwatch. They will then use the formula for speed to calculate the speed of a toy car, for example. This in turn leads to more math and re-teaching, because I find my students always need a refresher on how to round to the nearest hundredth, and how to find averages. They may also need instruction on how to properly read a meter stick or a thermometer.

Math is very much integrated into many of the science activities I do in my classroom.