The lesson plans that I attached to my portfolio, demonstrate my ability to incorporate a three-dimensional teaching (science and engineering practices, crosscutting concepts and core ideas) into my teaching. Next Generation Science Standards (NGSS) have been adopted by Georgia in the new Georgia Standards of Excellence (GSE) in the fall of 2017. The practices describe the behaviors that scientists need to develop in order to clarify for the students the relevance of STEM (science, technology, engineering, and mathematics) in every day life. Crosscutting concepts are a way of linking different domain of science and the disciplinary core ideas are instructions or assessments that need to be teachable and learnable, that need to relate to the lives of the students or provide a tool for understanding and solving problems. The Biology standards for High School have five units of study: 1. Structure and Function, 2. Matter and Energy in Organisms and Ecosystems, 3. Inheritance and Variation of Traits, 4. Interdependent Relationships in Ecosystems and 5. Natural Selection and Evolution.

During Medical School I took numerous science classes and during my Master of Arts in Teaching program at Georgia State University I acquired 9 credits in graduate level Biology courses. All this prepared me to cover the content required to teach Biology at secondary level. First class I took was Microbiology and I included my final proposal project on the possible benefits Bacteriophage Therapy (Loc-Carrillo & Abedon, 2011). Second science class I took was Genetics. This was a good way to refresh my memory and be prepared for my students, while genetics concepts are used all through the Biology Units. The last but not the least science class I took at GSU was the Nature of Science class. Nature of Science brings some new ideas into the picture. One of them is that the scientific knowledge is a tentative because it is not final. Though it is stable it is still malleable and the scientific discoveries are always adding up to our scientific

knowledge. Another idea is that key words (facts, theories, hypothesis) are misunderstood. Often the students think that scientific knowledge is a fact, but as I have said above, Nature of Science tells us that facts can change, depending on the situation. Hypothesis are statements based on previous observations that can be scientifically tested and theories are not just ideas that have not been validated but concepts that make sense, after many observations and experimentations. Another new idea is that scientific method is not a process that must be followed in the "correct" order, the scientific data and conclusions are what it matters. The idea that I like the most is the one that lets place for "human error". If scientists are afraid of doing mistakes, the discoveries will decrease considerably. (Clough, 2010) Aside for adopting the ideas of NOS, we also have to present it to our students in a way that will not alter the importance of it. People are not comfortable with things they don't know as well with things that are new. Viney (2007) considered that a good way to integrate NOS in classroom is by constructive listening, because it gives the opportunity to "explore thoughts in an unimpaled manner" (p.525)

In this portfolio I included a unit plan of three consecutive lessons for 9th grade Biology, that were tought on a block schedule, for 90 minutes each. Those lessons are part of the Inheritance and Variation of Traits Unit of study and they are Monohybrid and Dihybrid Cross and Pedigree. Those lessons were relevant to my students because it helped them understand the transgenerational inheritance among their own families. Those lessons were also a good opportunity for me to catch some misconceptions, for example: "Dominant genes are always the observed trait in heterogeneous situations.", when the proper concept it that the dominant genes are not the observed traits in situations that include codominance and incomplete dominance. (Smith 2014)

I am a long-life learner and I will never stop improving my content knowledge.

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