

Final Reflection Paper: From Indiana Standards to NGSS

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My professional development project was titled, From Indiana Science Standards to NGSS, where do I begin? My professional development was designed to help introduce our 3rd-5th grade teachers to the NGSS as Indiana will be implementing the NGSS this fall for the first time. Currently, we use Indiana State Science Standards. However, these standards are very basic and do not provide much support for teachers in the way of implementation. This professional development took place at my current elementary school, Flint Springs Elementary School. My professional development consisted of 9 Certified classroom teachers in grades 3-5. In the group of 9 certified teachers, two teachers were brand-new first year teachers and six of them had over ten years of experience each.

I chose to showcase and focus on the third-grade standards because these are the ones that I currently use in the classroom as a third-grade teacher. The current Indiana State Science Standards that we use in our third-grade classrooms are:

Physical Science (PS)

- o **3.PS.1** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- o **3.PS.2** Identify types of simple machines and their uses. Investigate and build simple machines to understand how they are used.
- o **3.PS.3** Generate sound energy using a variety of materials and techniques, and recognize that it passes through solids, liquids, and gases (i.e., air).
- o **3.PS.4** Investigate and recognize properties of sound that include pitch, loudness (amplitude), and vibration as determined by the physical properties of the object making the sound.

Earth and Space Science (ESS)

- o **3.ESS.1** Obtain and combine information to determine seasonal weather patterns across the different regions of the United States.
- o **3.ESS.2** Develop solutions that could be implemented to reduce the impact of weather-related hazards.
- o **3.ESS.3** Observe the detailed characteristics of rocks and minerals. Identify and classify rocks as being composed of different combinations of minerals.
- o **3.ESS.4** Determine how fossils are formed, discovered, layered over time, and used to provide evidence of the organisms and the environments in which they lived long ago.

Life Science (LS)

- o **3.LS.1** Analyze evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- o **3.LS.2** Plan and conduct an investigation to determine the basic needs of plants to grow, develop, and reproduce.
- o **3.LS.3** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

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- o **3.LS.4** Construct an argument that some animals form groups that help members survive.

Engineering (E)

- o **3-5.E.1** Identify a simple problem with the design of an object that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost.
- o **3-5.E.2** Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- o **3-5.E.3** Construct and perform fair investigations in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The change to the NGSS will be a big switch for Indiana educators and I wanted to create a PD that would help bridge the gap for the teachers in my building. We are currently given very little time for science and social studies in our day and schedule and I believe the NGSS will be a great way to have teachers create a more cross curricular approach to teaching their science content. In my PD I also included the 5E lesson plan as a way to analyze and evaluate the differences in how we create a current science lesson to what a lesson using the NGSS would look like with a 5E format.

My overall goal for this presentation was to educate the teachers on what the NGSS are, what they look like in comparison to the Indiana State Science Standards, what the components of the NGSS are and how to use them, and how to navigate the NGSS website. I also wanted to share with them a 5E lesson plan format that would show them how to incorporate the NGSS into a daily lesson plan. The goal with the 5E plan was to give them a reference for how a science lesson would look using the new NGSS standards in the classroom and to show them how it can be implemented across content areas.

For my professional development I created a pre-survey for teachers to help me better understand their knowledge base for the NGSS and STEM education. The following are the list of pre-survey questions asked.

- How many years of teaching experience do you have?
- How familiar are you with the Next Generation Science Standards (NGSS)?
- Have you ever used the NGSS to create a science lesson for your classroom? If so, how well did that lesson impact your students' learning?
- How familiar are you with the 5E lesson plan?
- How are you feeling about switching from the Indiana State Science Standards to the NGSS?
- What is one component that you feel is lacking in traditional professional development opportunities?

I was able to take the information provided in these questions and structure the flow of my professional development. I began my professional development with an opening ice breaker activity. For the opening activity each table had two different colored sets of post-it notes (one to

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use with the first plan and one to use with the second plan), a poster with “I noticed” and “I wonder” labeled at the top, and two different lesson plans. One of the lesson plans was a typical science lesson that we would normally use to teach weather and patterns. The second lesson was a 5E lesson plan that I created for one of my Endeavor courses for third grade which aligned with the NGSS. This lesson plan focused on obtaining and combining information to determine seasonal weather patterns across the different regions of the United States. Teachers were to read through the plans at their tables and make observations about what they noticed and wondered from each lesson. They were to take those post-it notes and stick them on their posters. The yellow post-its were for the basic lesson plan using the Indiana State Science Standards and the green post-its were for the 5E lesson plan using the NGSS. As teachers worked together to write things down on their post-it notes and add them to their posters, I walked around to observe their comments and listen to their conversation. When they were finished, after about 15 minutes, we took time to share out as a whole group the noticing and wonders for each lesson plan.

After the opening activity was completed and we had shared out our posters, I shared a video from the NGSS website that was an overview of the NGSS and how they were organized. This video was about 6 minutes in length. I appreciated that this video gave teachers a solid understanding of all of the components included in the NGSS with visuals. When we were done watching the video, I gave teachers time to ask questions that they had. We followed up this activity with time to explore the NGSS Website. Since the NGSS are so new and it can be hard to dive into all of the components in one PD timeframe, I decided to give teachers time to explore the website and how to search for their specific standards. I had them write down questions that came up at their table groups as they were exploring the website and then we discussed those questions as a group. This took a good chunk of time as teachers were engaged in the exploration of the NGSS website and talking through it with their colleagues. I would have liked more time to share resources for 5E lessons that are aligned with the NGSS from NASA and share more examples of how to take our current lessons and transform them into a 5E plan that will better meet the needs of students and help us better achieve success with the new standards. I believe that due to this being such a new transition in our building, these would be great follow up PD ideas moving forward.

At the end of the PD session, I asked teachers to complete an exit survey. The survey included the following questions:

- After learning about the components of the NGSS and where to locate them on the website, how comfortable do you feel accessing the NGSS standards for your grade level?
- What component of the NGSS do you feel will be the most beneficial to you as a teacher?
- What component of the NGSS do you feel is the most intimidating to use or understand?
- What are you looking forward to in the switch from the Indiana State Standards to the NGSS?
- As a teacher, do you feel the switch to the NGSS will be more impactful on your classroom learners? Why or why not?
- What component of our PD did you enjoy the most?

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- What component of our PD would you like to see improved?

I felt that this professional development was a great stepping stone for the beginning of future conversations as we make the switch to the NGSS. After the PD all of the teachers felt more confident in accessing their grade level standards on the NGSS website and better understood what components were included in the standards. Teachers still felt that the most intimidating component of the NGSS is creating a cross curricular lesson plan as we currently do not focus on teaching science on a daily basis and we have a very rigid schedule for language arts and math with little room for changes. Overall, teachers felt that the correlations provided for ELA and Math would be very beneficial for teachers as this information is already done for us and we do not have to sit and think about each correlation on our own. Another component that was felt to be very beneficial was the provided Crosscutting Concepts section of the NGSS framework. This section provides a quick snapshot of ways to incorporate the science standards in other content areas and gives teachers a starting point when thinking about how to implement the NGSS into a daily plan.

Teachers felt that the content provided in this professional development was very helpful since we are transitioning as a building and many of our staff members are unfamiliar with the NGSS. Many teachers mentioned wanting to have more time to discuss and think through the NGSS in grade level teams and talked about wanting some follow up PD that would allow us to go back through this again.

One of the frustrations mentioned in the feedback received was that this professional development was done at the end of the school year when we are all testing and finishing up end of the year activities with our current classes. It is hard to focus on new training and information at the end of a school year. The comment referenced having this PD during the summer, at the beginning of the school year or even the first week before school starts. Another frustration was that as a district we have received little to no information about the transition to the NGSS and what that is going to look like in our classrooms. We have not adopted a new science curriculum or text and teachers do not have the resources needed to feel successful teaching science in their classrooms.

Overall, I felt that this professional development was successful for myself as well as my colleagues. I felt that it brought about great conversations and allowed for discussions about next steps moving forward. I felt that the teachers enjoyed the content as well as the activities and were excited to discuss and share amongst each other. I feel that it is definitely a starting of a much bigger PD framework that will be needed. If I had one area in which I felt things did not go as well, it would be in having the time to really share resources with the teachers for the creation of 5E lessons that would align with the NGSS. I definitely think that the teachers would welcome a follow-up PD that would focus on taking our current lessons and shifting them into 5E lessons that follow the NGSS for each grade level.

This project was a great compilation of all of the components we have been learning about with professional development. Desimone (2011) tells us that there are several key components to good professional development which include: content focus, active learning, coherence, duration, and collective participation. For my professional development I focused on

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what teachers needed to learn to better teach and support their students with the new standards we would be expected to teach. The goal of my PD was not to have teachers sitting around listening to lecture, but to have them engaging in analyzing lesson formats for a traditional and a 5E lesson and to provide them researching time to better understand the NGSS website along with lots of time for discussion and collaboration. Marshbank (2018) told us that there are 5 ways to be a good teacher leader which include: show interest in other classrooms, help out when needed, advocate for growth, listen purposefully, and be positive and kind. I think that this professional development opportunity allowed for us to advocate for growth in our buildings in a positive and kind way that allowed us to show interest in other classrooms in our building, and provide a safe space for teachers to share their thoughts and feelings centered around a common purpose and theme. Teachers will be able to use the information from this PD over and over again in their classrooms because it is current, relevant, and applicable to what they will be covering in science beginning in the fall of 2023. Teachers will be able to access standards for their grade level and understand the different components the NGSS framework provides for them to use when creating a lesson. Teachers will still need support with creating 5E lesson plans that align with the NGSS and creating cross-curricular lessons to use throughout their entire day as this was not an area, we were able to spend a lot of time developing in a one-hour PD session.

References

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