Snapshots of Practice:

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Instructional Context:

I have the pleasure of teaching the undergraduate elementary science methods course at a public, 4-year institution in Washington. My students, who are a mixture of traditional and transfer students, are all elementary majors, with only one required science content course in their programs.

While I have been teaching for many years, this is the first year that I am teaching on the quarter system and my first year at a new institution. I teach my elementary science methods course twice per week for one hour and 50 minutes each. It's been an adjustment to take my courses and move them from 15 to 10 weeks, both challenging and revealing. Focusing on what best supports my future elementary teachers to see themselves as science teachers, confident and capable of implementing an inquiry lesson, has been my aim this year.

Our course starts by building a foundation by asking questions around *What should students know and be able to do in science K-8?* To a large degree, the answers to this complex question often share in the complexity and integrated nature of the Next Generation Science Standards. The three-dimensional approach to teaching and learning science often encapsulates preservice teachers' notions of what makes great science lessons, thus it serves as a way to evaluate instructional sequences.

Vignette:

The level of curricular support for new teachers varies widely; some schools provide a preset curriculum for all subjects and others leave these choices in the hands of each teacher individually. Despite the differences in these approaches, the task facing teachers remains the same. Either teachers must ensure the set curriculum as adapted to their teaching style meets the standard or teachers must envision a standards-based pedagogical approach on their own. Inherent in both scenarios is the understanding that teachers have the knowledge and skills to both interpret the standards and select instructional strategies that support student's development towards the performance expectation.

Unpacking the Next Generation Science Standards and deciding what instructional sequences best align to the skills and concepts are essential steps in this process. Yet, in the process of alignment often preservice teachers reference their prior experiences or focus on what they perceive as fun activities, rather than engage critically in the alignment work. For example, preservice teachers recall using oreos to show the moon phases as a student, therefore this will meet the performance expectation for sun-moon-earth relationships. The activity often is fondly remembered, despite its implementation likely having no connection to helping students understand or be able to model sun-moon-earth relationships.

Particular to preservice teachers, though, is this notion that their instructional experiences as a student are sufficient to meet the expectations of the Next Generation Science Standards (NGSS). To address this issue, I engage students in model lessons that lead towards mastery of a given number of NGSS standards. At the end of the lesson, I provide students with the Evidence Statements to the standard and they evaluate their experience in the model lesson against the criteria listed. I believe this is effective in helping to challenge alignment issues as students can be heard saying “let’s check out the evidence statements” while engaging in their planning in the future. That being said, submitted lesson plans indicate some preservice teachers either haven’t thought deeply about the standard or the activity and have misaligned standards and instructional activities.

I implemented the CKT Packet, *Building a Tower*, after introducing three-dimensional learning and the NGSS to help preservice teachers build an awareness of the complexity of the performance expectations and to start building a critical lens of instructional strategies. Preservice teachers independently responded to the task, debriefed their responses in small groups, and then the whole class organized based on similarity of responses. They generated arguments around why the response they chose represented the best aligned task, were broken into small groups with others who responded differently to talk about their reasoning, and ended with a class discussion.

Following the task, I displayed an engineering NGSS standard for 3-5th grade and had students engage in the cup tower challenge, a perennial favorite. Preservice teachers built cup towers based on the basic instructions of “use 10 cups to build the tallest tower,” and had a good time figuring out the ways to build the tallest structure. I then asked students to discuss alignment of the activity to the standard and, after a while, passed out the evidence statements. Students were able to talk about the discrepancy between the engineering challenges they had experienced and the criteria outlined in the Evidence Statements to show a lack of alignment. Their conversations were far more in-depth, surrounding how to amend the cup tower challenge and the intent of the standard as a result of their engagement with the CKT task.

Questions to consider:
What did Amanda choose as the ‘entry point’ for using the *Building a Tower* task and CKT Packet? What possible entry points do you see in your course or professional learning context for this or other CKT packets?