

TEAM Module Four

Assessment For Learning

Indicator: Using and/or designing a variety of formative assessments and summative assessments and criteria that directly align with the learning objectives and value the diversity of ways in which students learn. (Indicator 1).

Goal: I will design effective formative assessments that directly align to NGSS learning objectives so that my students will reach higher levels of proficiency on summative assessments.

Initial Summary: I have five classes of mostly juniors with a variety of prior knowledge. However, they struggle with retaining scientific concepts and key terms on a consistent basis. This leads to lost potential and lower student performance on student assessments. I've used formative assessments in the past but inconsistently and ineffectively. Through extensive resources and collaboration with peers, I created a plan to implement effective formative assessments that addressed student misconceptions and scientific concepts that students struggle with the most. Using the data I collected from these formative assessments, I constantly revised future formative assessments in order to strengthen student understanding which ultimately led to higher performance on the summative assessment. I was really excited about beginning this module with my mentor to address the issues so that I could be more successful in my teaching.

Reflection Paper:

As I began this module, my mentor and I met and went over the CCT Performance Profile in order to target an area of my teaching that I felt needed improvement. We began discussing the role of formative assessments in the classroom and I realized that I wanted to improve the effectiveness of the formative assessments given during classroom instruction. I also wanted to use and analyze data taken from these formative assessments in order to inform me of gaps in my instruction and how I need to adapt my teaching in order for my students to improve on summative assessments. I developed the following goal to address this area of opportunity: I will design effective formative assessments that directly align to NGSS learning objectives so that my students will reach higher levels of proficiency on summative assessments. I expect to see an improvement in the students' application of the subunit material over time (Based on Indicator 1).

After delivering the pre-assessment I collected a lot of data and needed to organize it in order to compile and analyze it. Although I've used the Excel program in the past, I needed to familiarize myself and become more proficient with using all its analysis tools. I reached out to the teachers in my PLC and asked for their help in compiling and analyzing data. I also attended a professional development workshop on how to utilize Google Forms in the classroom. Through the help of my PLC and by attending the professional development session, I learned how to post Google Forms assignments in Google Classroom and how the data is collected. I learned how Google Forms compiles the data in an Excel spreadsheet, making the process of recording and collecting data much more efficient and less time-consuming. I learned that through Google Forms I can see which students I needed to focus on the most as well as specific questions I needed to focus on throughout the subunit. Because of this new toolkit of programs, I learned how to analyze student data in real-time in order to quickly and efficiently adapt my teaching style as I taught lessons. Ultimately, I learned how to improvise during lessons in order to quickly address student misconceptions and targeted areas in the scientific concepts where students struggled the most.

In order to make these formative assessments effective, I sought out help. After multiple conversations with my mentor, I learned the utilization of formative assessment strategies can be very effective in gauging students' accomplishment of learning objectives, which aided me in planning future lessons. However, my current practice needed improvement. I routinely found myself overlooking the warm-up questions and not using them to their full advantage. The website *edutopia.com* explains the importance of frequently using common formative assessments: "if we are about getting to the end, we may lose our audience, the students. If you are not routinely checking for understanding then you are not in touch with your students' learning.

Perhaps they are already far, far behind." *Edutopia.com* suggested using strategies such as "the Three-Minute Paper," "One-Sentence Summary," "Misconception Check," and "Student Checklist." I learned that there are much more strategies for implementing formative assessments than I've previously thought. Realizing that a culture of formative assessment strategies in my classroom is not currently utilized to its fullest potential, I began to seek resources and answers as to how I can plan the subunit that focuses on utilizing data to design effective formative assessments.

I referred back to the textbooks I used during my first semester in my master's program. I found an excellent source titled *Teaching Strategies: A Guide to Effective Instruction*. In it, the authors state, "... when teachers begin to think of assessment *for learning* rather than *of learning*, the power of assessment as an instructional tool is released into the classroom" (p. 185). Assessment *for learning* began to change my ideas on not only how I was administering "check-in" questions and similar formative assessments, but also how I was collecting data on students' achievement of learning objectives. I learned that planning to use frequent formative assessments "for learning" throughout the course of a unit can impact the way students learn and connect to the course content.

As was expected, the pre-assessment results were very low. After collecting the pre-assessment data, I designed formative assessments that were then given to students to complete at the beginning of lessons as warm-up questions. These warm-up questions served the dual purposes of collecting data to inform my instruction and of gauging students' misconceptions and prior knowledge of the concepts being introduced that day. Student routines were impacted once they noticed the consistency of the formative assessments being given at the beginning of class. Students also began to make and construct connections between the warm-up questions with the objectives written on the board, giving them a better sense of purpose and direction that each individual lesson was taking. Now these questions consistently reflect student misconceptions and areas of opportunity. I added repetitive vocabulary to increase their likelihood of retaining their meanings and making connections with the concepts. Using these new strategies, students began to not only retain concepts, but also engaged more in discussions and in activities because they consistently practiced concepts from past lessons and connected them to future lessons.

With my arsenal of new formative assessment strategies, I planned, edited, and re-edited my formative assessment warm-up questions as we journeyed through the subunit. Before assigning the summative assessment, I assigned the post-assessment and was surprised at the results (See Table I). For every single question, there was an improvement in the percentage of students who answered correctly. There were some concepts that students demonstrated a very good understanding, but also some concepts that students still struggled with. These results impacted my instruction before assigning the summative test. I had to review the essential questions and key concepts of the unit to plan extra instructional time on concepts I deemed most relevant and important for students to learn. After focusing on the key concept of identifying the smell, name, and functional groups of molecular substances, the questions that measured this concept (Questions #1, 5, 6) showed the most improvement on the summative assessment out of all the questions in the data set. Question #1 improved from 33.3% on the pre-assessment to 87.5% on the summative assessment. Question #5 improved from 19.1% to 81.3%. Question #6 improved from 35.7% to 78%.

These results lead me to conclude that by changing how I collect data to inform and improve my instruction, I can greatly impact student learning. My students also commented upon these new practices as extremely helpful for their studying. I noticed how students were eager to figure out the answer to the formative assessments and how much more they participated in discussions. Although it took time to develop this routine, students now are more efficient at completing work and making connections between concepts sometimes even before I introduce those concepts to them! It was a great moment to witness a class of students collaborating on these formative assessments. For example, when students are struggling with answering a check-in question, their peers never hesitate to guide them in obtaining the correct answer. I witness this impact on my students

more than I ever have and continue to see improvements in those students that struggle with the rigorous chemistry curriculum. As everything becomes interconnected from formative assessments, problems of the day, review lessons based on misconceptions and finally summative assessments, not only did grades rise but so did the engagement as evidenced by the number of the students seeking extra help, engaging in higher-level discussions and by consistently completing assignments.

Looking at the data, every question showed an improvement in student understanding of multiple concepts covered during the subunit. However, there were some questions that still measured a lack of proficiency among my students. I am currently using this data to improve the subunit for next year and for continually improving my use of formative assessments within the classroom. After completing a Unit Review with my PLC, I used this data to inform my peers on concepts students most struggled with and we came up with ideas and suggestions on how to improve the unit in the future. When utilizing formative assessments effectively, the impact on students is remarkably clear, especially when pinpointing specific concepts. I admit that I have much more to learn and more room to grow in this regard. Being a teacher does not mean learning is over. As I gain experience, I am excited to learn more about the art of teaching and how best to reach my students.

TABLE I

Question	% Correct (Pre-Assessment)	% Correct (Post-Assessment)	% Correct (Summative Assessment)
1	33.3	80.8	87.5
2	16.7	61.5	65.6
3	16.7	38.5	62.5
4	28.6	38.5	46.9
5	19.1	50.0	81.3
6	35.7	57.7	78.1
7	26.2	42.3	43.8
8	23.8	38.5	37.5
9	28.6	50.0	59.4
10	11.9	30.8	68.8

