

Justin Yan, Charlotte—Middle School Science

Since the primary emphasis in elementary school had been reading and math, Mr. Yan's sixth grade science students entered his class with limited prerequisite knowledge—in fact, fewer than half of them could interpret fourth grade level science texts.

Rather than being overwhelmed by the tremendous task in front of him, Justin immediately began tackling the challenge. Even though his students were beginning so far behind, he knew right away that he wanted to aim even higher than mastery of grade-level standards. Justin consulted seventh grade, eighth grade and even high school science teachers to determine what prerequisite knowledge their students needed in order to succeed in their science courses. To develop his assessments, he pulled questions from rigorous eighth grade and high school state tests such as the New York Regents exam. His goal was for his sixth grade students to average 80% mastery of these rigorous assessments—to not only master the sixth grade standards but also many seventh grade, eighth grade and high school standards. It was an extremely high bar, but he would settle for no less.

Knowing that he would need to work hard to invest students and parents in a goal that some might consider unrealistic, he called the parents of each of his 155 students within the first week of school and introduced students to the Future Doctors Program, a student-friendly tracking system that gave students the opportunity to graduate from “Middle School” to “High School” to “College” to “Masters” to “Doctorate” as they mastered increasing numbers of objectives. Justin reports that this system, coupled with constant updates on their mastery, “has pushed my students to seek out any opportunity to retake un-mastered quizzes because they are always aware of their progress towards achieving our big goal. It also serves as reminder of the real life implications of their success in my science class.”

His efforts to earn parent and student buy-in helped Justin set the stage for success, but ultimately his greatest strength may have been his dedication to rigorous backwards planning, frequent tracking of progress toward the goal, and disciplined, skillful reflection on what he could do to improve as an instructor in order to accelerate that progress.

All of these efforts paid off, as Justin's students achieved an average of 81% mastery on assessments that included a substantial amount of *high school* material. Justin was recognized as Outstanding First Year Teacher of the Year at his school.

While Justin celebrated his students' success, he knew he could do even better. In his second year, he made his goals even more ambitious: “My students will be leaving my class with not simply a mastery of the sixth grade standards, but a solid foundation necessary for any accomplished scientist.” He made his standards even higher, further increasing the rigor of his assessments. In order to constantly reinforce their knowledge of the scientific method and experimental design, he also required all of sixth graders to complete at least five high-school-level lab reports which he would assess using a high school lab report rubric he adapted from a high performing local high school. He also added a “science fluency” goal requiring his students to go beyond mastery and be able to effectively articulate their knowledge in conversation and in writing, so this year, “Every lesson had an articulation component, either verbally or in writing, where students focused on

speaking as passionate and intelligent scientists.” He wove components of science fluency into his unit plans, assessments, and lesson plans.

Justin also thought a lot about classroom culture as he reflected on his first year. He realized that the culture had been focused on individual student achievement and this year he wanted students to be more invested in one another. Inspired in part by observations at KIPP-Charlotte, Justin adopted a vision of culture in which they practice their motto of Ubuntu (“I am what I am because of what we all are”).

In time, Justin’s students became more and more invested in the success of their classmates. They learned to analyze their class student data to identify their own strengths and weaknesses as well as identify classmates who have complimentary strengths and weakness, and this promoted purposeful and effective peer collaboration. Students are constantly using the data to “Give and Get Help,” a core value of the Future Doctors Program. By the end of the year, Justin described his class culture as follows:

Students refrain from bringing each other down, and take advantage of any opportunity to lift each other up. . . . my students have come to understand and have become deeply invested in not only their achievement, but the achievement of the class. They understand that their success is determined as an entire class and as a result, they push each other to reach great heights, they are patient with one another, and they seek each other out for help.

In addition to his success in improving classroom culture, his increased efforts to improve students’ science fluency also paid off. In a typical lesson, “approximately every 10-15 minutes, my students were summarizing their knowledge to their neighbors to deepen their understanding and ability to articulate their newly acquired knowledge.”

By the end of his second year, Justin’s students had achieved an average of over 90% mastery on his extremely rigorous assessments, with 90% of his students achieving at least 80% mastery. In addition, all of them participated in a school wide science fair that Justin organized, and one of the winning students subsequently took third place in the district-wide fair.