Getting Students to Mastery

Differentiation: It Starts with Pre-Assessment

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If teachers want to create flexible groups that address students' needs, they need to pre-assess.

A year or so ago, I had the pleasure of working alongside a colleague who by all accounts was a fantastic teacher, Lily Rhodes. As a teacher-researcher from a local university, I was curious to see how this teacher differentiated instruction for her 7th grade science students. To satisfy this curiosity, I observed her teaching and interacting with her students. In addition, we had in-depth discussions about her approach.

Lily has taught 7th graders outside a large, southeastern metropolitan area since 1997. Over the years, she has taught science, language arts, and reading on two-, three-, and four-member teaching teams. At the time of my semester-long observations, Lily was teaching science and language arts on a six-member teaching team.

Differentiation seemed to be working in Lily's classroom. The students didn't appear to worry about the differences in requirements among their peers, and they willingly worked at a level that challenged them. A classroom snapshot shows how Lily managed this.

A Look into Lily's Classroom

Before starting a unit in science, Lily had her students take a pre-assessment that required them to circle the parts of the body that belong to the nervous system: "Flip over your quizzes. Circle what it says to circle. Then turn it back over. Go!" When they finished, Lily collected the quizzes. She quickly graded the papers and sorted them into different piles while students watched a short Schoolhouse Rock clip on the nervous system.

Lily had written the day's agenda on the board: 1. Warm-up and quiz. 2. Nervous system stations (Anatomy Arcade, Ready or Not, Rhodes Scholars). After the video clip, Lily divided the students into different groups on the basis of what she learned from the quizzes. She sent two boys to the back computer and two girls to the front computer to extend their knowledge of the nervous system in the Anatomy Arcade station. Six students were sent to the front table to work with Lily at the Rhodes Scholars station, and the remaining students broke into pairs to conduct an experiment at the Ready or Not station.

Lily clearly stated what everyone should do:

For those of you in the Anatomy Arcade, you'll see a tab called "Nervous System." Choose one of the games listed, and play it with your partner. If you're with me at Rhodes, we're going to be doing something special. If you're in Ready or Not, read the experiment directions on page 626, and get started.

As students started to work, Lily told me in a whisper that the students in the Rhodes station were struggling with nervous system information. "We're going to go over it again," she said, "and then I'm going to work on the skeletal system so they'll be experts when we start that system tomorrow. Hopefully, they'll be able to teach it to the rest of the class."
Creating the Groups

Lily decided to arrange the graded quizzes into three groups: students who got all the questions correct, students who missed one or two questions, and students who missed more than two. Her practice of giving daily short quizzes during the body systems unit began two years ago. After students took the quiz at the beginning of the class, Lily quickly assessed their understanding of the concepts and organized them into groups that differed day to day, depending on quiz results.

Anatomy Arcade

What stands out in this snapshot of one class period is that Lily decided to use the computer to extend the knowledge of students who scored 100 on the quiz. The advanced games found under the Nervous System tab—a folder set up on the computers with online games and interactions for students to choose from—required not only a high level of understanding of the nervous system, but also the ability to make anatomy-based decisions to keep animated characters alive. These games entailed a lot of intense reading and decision making that engaged and enriched students who were already comfortable with the material.

For Lily, the standard was simply a starting point. She believed it was her responsibility to take students who knew the material to a more in-depth and complex understanding. For example, in one of the games, students had to not only identify the parts and functions of the nervous systems but also delineate connections between nerve impulses traveling from our brains to which body part, why, and how. This goes beyond the standard “Explain the purpose of the major organ systems in the human body.” Students had to read about each nerve connection (for example, the liver, thoracic, and brain connection) to play the game. The students in this group had already aced the pre-assessment in which they were required to explain the purpose of the nervous system. So were they learning?

Yes.

Ready or Not

The students in this group—those who had missed one or two questions on the quiz—were responsible for designing their own experiment. Lily believed they needed reinforcement of a few simple concepts to fully grasp the material for the day. This station required the students to work in pairs to read through directions, conduct an experiment using meter sticks and timers, and interpret the results.

Students in the experiment station explored stimuli and response time—with both voluntary and involuntary responses. The students began with one partner holding a meter stick 50 centimeters above the desk and then dropping it while the other partner caught it. After writing down various measurements from this initial task, students worked to design a similar task to test response to stimuli. Students then analyzed the work by writing about stimuli, response, and nervous system parts and functions. This learning task encouraged the students to further explore how the nervous system responds to stimuli and cleared up the few misconceptions the students had.

Rhodes Scholars

The quiz results showed that six students really struggled to understand the different parts and functions of the nervous system. These students missed three to six items on the 18-question test (or scored between an 83 and 67 percent). Many people would consider 83 a sufficient score and not consider the student in need of remediation. However, Lily decided 83 wasn’t good enough. This group met with Lily to review the material in the standard. Lily drew from many different practices: Students reviewed orally; made flash cards of key concepts they missed, such as the parts of the nervous systems and the functions of those parts; and quizzed one another before they retook the quiz. These students scored either a 100 or a 94 on the retake.

Further, Lily didn’t stop with remediation with this group; instead, she chose to frontload the next body system, the skeletal system. These six students got a preview, through direct instruction, into content for the next day, enabling them to lead the discussion and teach the rest of the students the major concepts of this system. For example, the students led the class in the labeling of the major parts of the skeletal system. This practice placed the students in a more privileged, responsible role, affording them some academic benefits with their peers.

On this particular day, several of the students in the Rhodes Scholar group were those with school-sanctioned labels, such as “struggling reader” or “learning disabled,” which had been a part of these students’ academic careers. Many had already experienced academic failure. Lily wanted to accelerate their progress to help them achieve more.

She didn’t engage the group in inquiry-based instruction practices that day, however. The Rhodes group made flash cards, listing such questions as, "What are the two main structures that make up the central nervous system?" and "What are the functions of the spinal cord?" Although this is a more traditional practice, in this group flash cards had a different feeling. The students chatted with one another while making the cards. They asked Lily to clarify concepts so the information on the cards would be easily understood and to quiz them using the cards. "Great job!" she would say. "You missed three. Practice with the cards a little more, and you'll have it!" Not every student in the room needed to work with flash cards. These students, however, benefited from the practice.

Four Lessons Learned

How can we transfer these practices into other classrooms? First, we have to build a learning community founded on trust and respect. Lily didn’t sentence the struggling learners to a remote location or berate them for doing poorly on the quiz. She
approached them with a respectful tone; they knew she would work tirelessly to help them learn and develop a deeper understanding of the content. They knew she respected them and wanted them to succeed.

Second, teachers must use pre-assessments to make decisions; we must become what Carol Ann Tomlinson called "assessment junkies." Pre-assessment enables us to base our flexible groupings on data and not on feelings. Lily carefully divided the groups on the basis of the quiz results so each student was challenged and could move forward.

Third, we can apply this lesson structure to any content. For example, a literacy teacher could give a pre-assessment on a passage's main idea; have students watch a quick video while he or she grades the quiz; and then divide the students into three or four groups on the basis of whether they need instruction on concepts, practice on the few concepts they missed, or enrichment. A math teacher could pre-assess students on their knowledge of positive and negative numbers at the end of a class, grade the short quizzes before the next class, and begin that next class by grouping students on the basis of their needs.

Could teachers do this every day? Sure. Do they need to do it every day? No. Teachers could start with one or two lessons per unit; the following year, they could expand on their growing repertoire of differentiated materials.

Each lesson does take some additional planning. But becoming a master differentiator does take time. Just start small, and go on from there.

Author's note: The teacher's name is a pseudonym.

Endnote