What is the Most Important Thing We Can Teach Our Students? It's Not About the Content

I've had discussions, and even arguments, with my coworkers about 'what is important' to include in our shared curriculum map and how to phrase learning objectives. There are currently 89 learning objectives in our chemistry curriculum map, covering six different units. This is less than the 94 learning objectives in last year's curriculum map (and we didn't actually get to all of these last year).

I've had discussions about whether our curriculum is 'really' an 'honors chemistry' curriculum, whether our students 'can handle' everything, and 'what's necessary.' And these are all good and interesting discussions to have as teachers. We're trying to focus the curriculum and to think about how students learn and how to help them learn. I teach chemistry because I absolutely love how chemistry and science explain so many things about the world we encounter every day.

But I recognize that many of my students will not go into STEM fields when they are done with high school. And, despite all the push for STEM education in this country, I don't think that all or even most of my students should pursue STEM fields. There is also some compelling evidence that there are currently more STEM degrees awarded in the United States than jobs available.[1],[2]

I would love to see my students develop a genuine love for science, but I also want it to be OK for them to have other interests. After all, what world would it be if everyone was a scientist? Then again, I don't want my students to think, 'Chemistry is just really hard so I'm not going to get it' or, 'Oh, I'm just not a science person.' The mindset I want them to develop is, 'I can do science, but I choose this other thing I'm passionate about instead.' I want them to be

comfortable with science and scientific reasoning.

And to get them to the point of feeling capable with science, I'd like my students to be able to think scientifically. To be able to look at a model or analyze someone's statement, and decide for themselves whether they agree with the conclusions that have been drawn. When a student asks me a question about an assignment, my response is often (but not always), "I don't know. What do you think?" And just as often, my students' frustrated response is, "But you know! Why won't you just tell us?"

My reply to this frustration is that I want them to think about it, that they are capable of figuring things out. I should go this route more often, but I readily admit that sometimes it's much easier to just point them toward the right answer.

And when I do this, I do them a disservice, because I'm short-circuiting their thinking and I'm sending them the message, "You can't do this yourself so I will do it for you because I am more capable than you are." Instead, I want to send my students the message, "You can totally figure this out; you have all the information in front of you that you need, and even though this looks difficult, you are capable thinkers." My goal is to build their self-competence. That wasn't a typo for self-confidence, by the way. I don't necessarily want them to feel confident, I want my students to see themselves as competent – able to perform a specific job/activity properly.[3]

The class structures I choose are intended to help students in this development. I use a lot of group work in my class, and I lecture as little as possible. This is partly because I myself dislike lecturing – I'm not a center of attention kind of person, and I find it frustrating when students are dropping off during a lecture, which inevitably happens. I find it easier to keep students engaged with group work than a lecture. I do my best to give them real 'group worthy' or 'conversation worthy' tasks (as discussed further in Horn's book "Strength in Numbers"[4]), although I admit that it can be difficult. I rely on resources vetted by other teachers, such as the Process Oriented Guided Inquiry Learning (POGIL)[5]resources and the Modeling Instruction resources.[6]

Some students have said that my class is harder than their AP U.S. History class, but I remind them that they've seen some parts of U.S. History in the past, whereas this might be the first time they're really seeing chemistry. It is easy,

sometimes, to forget that my students are still developing mentally because physically, many of them are taller than me, and they *look* like adults. But for some of my students, my class is the first time they are struggling in school. For others of my students, they struggled in freshman physics so they come in with a mindset that they just can't do science.

And it's also easy for me to get caught up in the content – they still don't understand naming ionic compounds! Why didn't they memorize the elements I assigned at the start of the year like I asked them to? The organization and layout of the periodic table is fascinating, and it makes chemistry so much easier to understand – why can't they see that too? I have to pause, and remind myself that the end goal is not a wonderful mastery of chemical knowledge (although I hope that would be a byproduct of all of this!), because it's not about the content. In reality, there isn't an end goal; instead, I am stepping alongside them on this part of their journey, doing my best to give them *just enough* support so that they can realize how much they can do on their own, with their own brains.