https://www.nwesd.org/edtalks/blog/talking-thinking-next-generation-science-standards

I have to be honest. When I hear a student who can parrot back to me something I’ve told them, I don’t feel very inspired by it. But if I hear students sharing ideas and thoughts that they’ve never heard from me, and that represent a deeper understanding of the things we’ve studied together… now THAT is inspiring! I think about a former student of mine; I’ll call her Tammie here. My 8th graders were talking about density as a characteristic property (a property that doesn’t change with sample size). Some of them thought that a bigger piece of wax would have a greater density. Others already understood that the decimal representation of the ratio of mass to volume would stay the same. Tammie thought density should “get bigger” if the piece of wax was bigger. She was convinced of it.

Tammie was not alone, but in her written conclusion to the experiment, she concluded that sure enough, density of the wax increased as volume increased. It turns out; her calculations were based on measurements that were just as imperfect as almost any 8th graders’. So her calculated density values of 0.961, 0.962, and 0.963 sure looked to her like things increased.

I asked my students to plot the wax with a few other materials we had studied on a graph before talking about similarities and differences they noticed between the graphs of the materials. I don’t know what Tammie had said with her group at first. But she was very animated. When I got to her table, she was saying, but that can’t be right!” As I approached, I saw her face change. Something clicked. Tammie’s eyes went very wide. Her mouth hung open. And I watched the corners of their lips pull up and stretch her mouth into the widest smile in the room! “I get it!” she said. “I get it! I thought density was increasing, but these other things… some of them increased and some decreased but all of it just a little bit... like, so little it doesn’t matter! They’re all the same!”

Think about that for a moment. In writing, she didn’t get it. But in *talking* about it, in that quick interaction that allowed her to explore many ideas in a short amount of time, she had a revolution in her understanding not JUST about reliability of measurements, but also of the nature of this one characteristic property.

At the heart of the Next Generation Science Standards (2013 WSSLS) lies making meaning: either through explaining phenomena or through developing solutions to problems. Because student talking *is* thinking, we want to engage as many students as possible in the practice of academic discourse.

Mark Windschittl’s Ambitious Science Teaching group at University of Washington has an excellent resource that teachers can study individually, or in groups called the [*Discourse Primer*](http://ambitiousscienceteaching.org/wp-content/uploads/2014/09/Discourse-Primer.pdf). In it, teachers can explore the different *reasons* why they may want to engage students in discourse; the nature of question types that can deepen student understandings; and some “teacher moves” that they can intentionally practice to keep kids talking so they can keep making sense of phenomena or designing solutions.

While the resource itself is written for a science-education audience, it is equally accessible and useful in subjects beyond science. I hope you will take some time and check it out!

Ambitious Science Teaching Discourse Primer [[LINK](http://ambitiousscienceteaching.org/wp-content/uploads/2014/09/Discourse-Primer.pdf)].