# Four Elements to Professional Growth

When searching for ways to become better teachers, all educators can, and often do, ask, "How can we continue to grow?" More specifically, the question might be better framed as, how can we use information from our classes, professional development experiences, and colleagues/students to help us improve our practices? This question is central to what we do at the Knowles Science Teaching Foundation (KSTF) and is a large focus during the third year of the Teaching Fellowship. It's also a question that I have been examining in great detail. In particular, I have worked a lot with Erin Furtak, KSTF Team 2 Specialist, and Zora Wolfe, KSTF Program Officer, Teacher Development, around how teachers can collect and interpret data to improve teaching and enhance students' learning. We've been developing a framework for teachers that focuses on four major elements to professional growth: goals, tools, data, and inferences. As a teacher, you are constantly inundated with an enormous amount of data. This information comes from many sources including:

> students' performance on standardized tests, assignments, and teacher-made assessments;
> questions or comments during whole-group or small-group discussions;
> the textbooks or other curriculum materials used in your classes;
> students' interactions with you and with each other.

While many teachers know that all of this information can be useful, it's easy to be overwhelmed with the enormity of information available to you. How can you begin sifting through all of this data? Should you even try? The four elements mentioned above (goals, tools, data, and inferences) can be especially helpful in assisting you in targeting specific information that can prove useful in improving your teaching. These elements can also help you find approaches to learn more about specific areas of your teaching that interest you the most. So before trying to make sense of all the information that's available (an impossible task!) it's valuable to think about your goal. What is it you want to explore? What would you like to learn more about? Through identifying a specific goal, you can more purposefully consider what information would help you learn more about the area that interests you. For example, maybe you want to learn more about how well students understand a concept like conservation of momentum. Some ideas about information that could help you pursue this goal could be: (a) students' responses to specific test questions; (b) how students apply the concept in a lab activity; or

(c) students' comments during class discussions around this concept. Having identified your goal, you could feel better equipped to create tools that will generate the information you're seeking. These ideas might push you to modify a particular test question, tweak a lab activity, or change questions you ask during whole-class discussions. Similarly, your goal might lead you not only to modify how you collect information, but alter what you look for in test responses, as an activity unfolds, or during class discussions, all in an effort to get more useful data that specifically relates to your goal. By having a more targeted approach to your test questions, work during labs, and conversations in class, you can collect more meaningful information that helps you learn more about your goal. Reviewing this information with a plan of how to make sense of this data will allow you to make inferences from your data. These inferences from your data will give you insights connected back to your goals. While this technique (Goals: Tools: Data: Inferences) I'm describing might make the process seem smooth, it can be complicated and take a lot of time to develop and complete. Additionally, it can be easy to miss different inferences that could be reached from your data or easy to gravitate towards the same tools each time, even when other tools might be more useful in some cases. We all enter this process with our own biases, perspectives, and values that influence our work. That's why it can be helpful to ask: How can other people assist with this work and open our eyes to more ways to think about our goals, tools, data, and/or inferences? In what other ways could colleagues help us with this process? This work can be challenging and exciting. Focusing on these four major elements of goals, tools, data, and inferences can help scaffold a process for professional growth. Similarly, collaborating with colleagues can make this work more powerful. What have been your experiences using data to grow as a teacher? Have you tried similar approaches to the ones described here?