Why I have my students explore methods of the geosciences

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Over the past several years I have taught a course that has the title: Tools of the Geosciences. This is a course that all geoscience major take at my institution during the fall of their sophomore or junior year. After they take this class, the students begin a three semester thesis sequence. The principle thrust of the class is to orient the students to studies in and about the geosciences. They are given a broad background in many aspects of geoscience in an attempt to start them thinking about their thesis project. They get a little bit of everything in this class. Topics covered in the semester include a basic definition of the geosciences, field measurement methodologies, computer techniques, and library research methods.

When I get these students they are often brand new to the program. They have probably found their way into the major via our general education courses in Physical Geology or Environmental Hazards. The find the topics interesting, have a propensity for science but very little knowledge about geoscience. Because I want to give these students a broad overview of geoscience, I take something of a mile-wide-inch-deep-approach. Even though I have a limited amount of time to spend on each of the topics on my syllabus, I have found that the students develop a greater understanding if I do not lecture on some topics even though it could be accomplished in much less time. Instead, I allow the students to grapple with certain assignments without specific directions. It really annoys the students when I don’t tell them outright what they need to do. Of course the pay-off for the student is they play a larger role in the development of their own understanding of the new concept or technique. If I were to simply tell them, they would not find it nearly so meaningful.

For example, in the activity that I am submitting for this workshop (measurement of a quarter acre), I refuse to tell the students how to use the tape measure to most accurately delineate their square of land. Quite often the students anticipate the assignment will be very simple; after all, how hard can it be to measure a square? Frustration sets in quickly because they simply don’t realize just how hard it is to measure straight lines that intersect at 90 degrees over a longer distance. It becomes even more frustrating to them that I will not tell them what they need to do to get a good square. I will also point out how flexible the tape measure can be and pulling too hard the distance can be distorted. The end result is the students really have to think on their own. At some point, realization sets in and the students figure out what needs to be done all by themselves.

So, basically, my approach is not to “teach” particular methods of geoscience. I am happy to be a resource for the students and give them guidance. Ultimately, however, they discover what they need to know on their own. Such a discovery makes that knowledge all the more meaningful.