Teaching the Scientific Method at a Community College

About 4 years ago our science department at Klamath Community College(KCC) decided to standardize the way we presented the Scientific Method to our students. The way this all came about was that we realized that every textbook in every science course we offered had different steps, or at least a different number of steps to the Scientific Method. If they were taking two or more science courses in a quarter they would have to remember more than one way to interpret the Scientific Method. Some textbooks had as few as three steps while others had many more: The age old debate between the clumpers and the splitters. So after long thought, hard work, and many revisions, we came up with a compilation of steps, found in numerous books in various disciplines within our department. We came together and debated the merits of both sides of the issue, and being a very egalitarian group decided we were all right. The result being, “The insert here Steps of the Scientific Method”. At this point the head of our department, a Ms. Goldie Locks made the final cut to 6 steps. Not too many, nor too few, but just right. The steps being:

1. Observation
2. Question
3. Hypothesis
4. Test/Experiment
5. Results
6. Conclusion

Now, this may seem a whole lot about nothing to you, dear reader. But, this allows a certain continuity, especially in sequential courses like Physical Geology 1 and 2. A student having taken one science course here will be better prepared, and hopefully have their understanding of the Scientific Method reinforced. The very first Lab in all of my courses is on this subject. We also include, “The Parts of a Lab Report”; “Independent Investigation Guidelines”; as well as a fill in the bubble flow chart and quiz. (See Attachments) They also get to make up their own experimental Procedure. Which they seem to have fun designing, knowing they will not have to actually perform the experiment. They can get pretty wild!

For some students this is the first time they learn that scientist think differently than the rest of the world. I talk to them about the Ancient Greeks, and how they were the first to begin the systematic study of natural phenomena. I describe some of the achievements of these great thinkers. I also name a few, with the belief that credit should be given, where credit is due. I warn you though, mentioning more than two or three Greek names tends to make their eyes glaze over. We talk about the difference in the use of the term theory in everyday use, verses what it means in a scientific context. I will use an example such as, “I have a theory that that darn dog next door got into the trash can last night!”, being a completely different use of the word than “The Theory of Evolution”.

I will bring-up Scientific Method throughout the course to talk about bias, inaccuracy, and conflict. In a Geology Lab presentation I point out that Wegener’s idea on Continental Drift was a hypothesis not a Theory. The reason being that he did not have a mechanism to explain his findings. Then I ask them if Plate Tectonics is a hypothesis or a Theory. The aim is to get them to debate and then conclude that a Theory must have a preponderance of evidence and the findings must be repeatable under many different conditions and circumstances throughout the world. We then can look at plate boundaries as surface morphologies that reflect convection currents in the Asthenosphere.

The main reason we have taken this approach is it gives the student a starting point for them to begin to think as scientists. This approach to the Scientific Method also gives them a sense of continuity here at KCC. They learn it once and in every science class they take it is reinforced. I’d like to think this is a good thing that will encourage them to continue with their studies in the Sciences.

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