

Teaching Assistants for lab sections should be aware that undergraduates may be involved in some kind of data manipulation (Turrens and Davidson, 2001). A survey of 700 students taking science classes at ASU in fall 2000 revealed that over 50% admitted to manipulating data (Davidson et al., 2001).

Suggestions for teaching assistants to prevent data manipulation:

1. Remind your students about ASU's policies on academic integrity and about the possible sanctions.
2. Clearly state your expectations for independent work versus collaboration among students. Tell students what behaviors are not allowed. Tell them to ask you if they are unclear.
3. Discuss the objective of each lab project and explain to students the hypothesis behind each experiment. Every experiment has a purpose.
4. Emphasize to your students that they need to understand the experiment rather than following a "recipe." You can do this by giving them quizzes where they explain in scientific terms what is happening in each step of a specific procedure.
5. Explain to students "data is data" and that there is no right or wrong. The beauty of science - it makes you think.
6. Encourage students to write an effective discussion section. This is the main part of their report, the place where they have to discuss their results in depth. It is useful if you request a minimum number of scientific citations so that they will look in depth at their project and see how the results are similar to other findings.
7. Give examples of how they should write about an experiment that didn't work (e.g., There are several things that could go wrong in an experiment such as the omission of the adequate enzyme cofactor which could diminish the enzyme's activity. . .rather than. . .The reaction didn't work).
8. Keep your own record about your students' results. They will be surprised that you know their data and will take more responsibility in keeping a good lab notebook.
9. Provide them with examples of possible outcomes of related experiments and ask them to interpret the data (make them think). This will make it easier for them to interpret their actual results.
10. Remind your students to come to you with any questions regarding their project and that the main objective of the class is not only to follow proper techniques but to know how to interpret their data.

References:

Davidson, E. W. , Cate, H. E., Lewis, C. M. and Hunter, M. (2001). Data manipulation in the undergraduate laboratory: What are we teaching?. Proceedings: investigating Research Integrity. 27-34

Turrens, J. F. & Davidson, E. (2001). Data manipulation by undergraduates and the risk of future academic misconduct. Council on Undergraduate Research Quarterly. Retrieved June 23, 2010 from <http://www.cur.org/conferences/responsibility/datamanipulation.pdf>