Ethics in General Chemistry

1. Read the three case studies and answer the question. Taken in part from Paul Treichel, Jr.: Ethical conduct in science—the joys of teaching and the joys of learning. *Journal of Chemical Education* 1999;76:1327.

**Case 1** Able and Baker were assigned an experiment asking them to confirm Boyle’s law, which involved measuring the volume of a gas sample at various pressures. Boyle’s law is presented in Chapter 5. In all, they collected 12 different sets of data. When they met after class to graph the data, however, they discovered that two measurements differed greatly from the others. After deliberation, they concluded that they must have made inadvertent errors in these measurements, perhaps by misreading their ruler or by writing the numbers down incorrectly in their notebook. Able and Baker reconciled the discrepancies by simply dropping the two sets of “erroneous” data and recopying their remaining data onto a new sheet to turn in. Thus, their written laboratory report contained a neat table of the satisfactory data (10 sets of pressure-volume measurements), with their graph showing all points lying on the line. They did not mention the omitted data in their report.

**Case 2** Later in the semester, Able and Baker performed a heat-of-reaction experiment similar to those mentioned in Chapter 9. Here, they measured the increase in temperature generated by a reaction between an acid and a base. By this time, they had become rather capable in the laboratory, so preparing solutions took little time and they quickly were able to carry out the reactions in triplicate. Later that evening, they calculated the results of their three experiments. Two of the three determinations gave almost identical results, but the third differed by about 20%. Able and Baker considered dropping the third value and showing only the first two results, but they thought that reporting three determinations would look better than reporting only two. Plus, the grader might see from their data sheets that they had done the experiment a third time and question the omission. So instead, they decided simply to change the data. They scratched out the final temperature in the errant data set and wrote in a value that was 20% higher. Using this number, they recalculated the result and the answer was close enough to the first two results to pass any reasonable inspection.

**Case 3** Able and Baker passed Chemistry 1 and continued on to Chemistry 2. In their second experiment in the laboratory, they determined the rate at which a product formed by measuring the absorption of light by a colored product in one of the instruments in the laboratory. Two nights later, while Able and Baker were in the chemistry computer laboratory working up their data, they ran into a problem. The graph of the first four measurements gave a straight line, but the next four points were off the line. For a while, Able and Baker were puzzled as to which data to use, but then they remembered that midway through the experiment, the original instrument stopped working and they switched to a different one. (In fact, they had even made a note of this in their notebook.) Clearly, the problem must have been with the instrument. They decided that the logical way to deal with this problem was to impose a correction factor, so they multiplied each of the values obtained using the first instrument by a factor of 1.04. Both sets of data
were then used to plot a nice, straight line. However, they decided not to mention the correction factor in their report because it was just too complicated for them to explain.

Select the case study in which the actions are the least defensible. Write a paragraph identifying the ethical issue and explain why you chose this point.

2. The General Chemistry grader approaches the professor with a quizzical look. She is grading a laboratory report submitted by Ann and Bob who did the experiment in the Wednesday section. They shared a laboratory station, so they submitted a single report with both of their names. The report has a word badly misspelled. The oddity is that the grader saw the same badly misspelled word in Charlie’s report in the Monday section. The professor asks Charlie, who did the experiment by himself, to hand his report back for regrading.

Charlie’s report is word-for-word identical to Ann and Bob’s. Even the data are identical. Ann, Bob, and Charlie are summoned into the professor’s office and the laboratory reports are read by all. Bob is stunned. It seems that Ann and Charlie are dating, and that Charlie did the report first and gave his report on disk to Ann. Ann said that she meant only to look at the report as a template, but she accidentally pasted it into her report, overwriting all her data. The professor points out that the only change he can see is that the Charlie’s name was changed to Ann and Bob—everything else is the same.

Bob is getting physically ill and protests that he knew nothing about any plagiarism, that he submitted his part to Ann and that he should not be punished by her transgressions. Charlie and Ann say it was an innocent mistake, and that the professor strongly encourages students to collaborate and, therefore, should be understanding and lenient. The professor asks them to recommend an action.

2. What do you recommend? First, decide whether you will recommend the same action for each and explain your reasons. Next describe the action for each person and explain why you would recommend it.