

Providing a Chemistry Laboratory Experience for a Cerebral-Palsied Student

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An increasing amount of information has been published in recent years on how to accommodate handicapped students in a science laboratory course. Most of this material gives only very general guidelines; however, a special issue (Vol 58, No 3, March 1981) of *THIS JOURNAL* was devoted to specific recommendations for teaching chemistry to the physically handicapped. To this we would like to add our observations based upon experience with a handicapped student in a college-level, first-semester chemistry laboratory course. The student had a visual-motor coordination problem and had been diagnosed as having cerebral palsy. Even though we recognize that each handicapped student (like all students) has a unique set of abilities (and handicaps), these observations will provide a starting point in planning to deal with a cerebral-palsied student in a chemistry laboratory course.

The student we dealt with was able to walk (with much effort) and could communicate verbally. She could write legibly (if given enough time) and was very good at mathematics, which was her major. She enrolled in the course to meet our general education requirement of completing at least one laboratory science course.

We provided this student with her own undergraduate laboratory assistant whose job it was to supervise each experiment and provide assistance in manipulation of equipment when necessary. Funds for this assistant were provided by our university's student affairs office (about \$160 for the semester). The assistant was also able to work with other members of the class, thus helping the regular laboratory assistant. It was much easier to find an undergraduate chemistry major and train her to assist the cerebral-palsied student than to find a special education major with enough knowledge in the area of chemistry to provide the assistance needed.

All the handicapped student's work was done at a regular laboratory bench. We did provide her with a laboratory stool. However, she did find the three-hour laboratory period a long and tiring experience. She took breaks frequently throughout the laboratory period but was still able to finish her work on time. Her laboratory reports were excellent. She had no trouble calculating results and drawing conclusions

from her data. We did give her additional time to prepare her reports as her penmanship was much improved when she was not rushed.

The student continually surprised us as to the amount of laboratory equipment she could successfully manipulate. The most surprising experience came at the beginning of the semester. As in many first-semester chemistry courses, the first laboratory involved making glass bends. She was not able to manipulate the short pieces of glass tubing we had provided for the other students but had no trouble producing excellent 90° bends with glass tubing pieces at least 45 cm in length. The assistant cut off the extra tubing after cooling. The assistant reported that the student's bends were some of the best produced by the class.

The student was not able to manipulate a quadruple-beam balance. Consequently, we provided her with a top-loading balance. She was unable to pour liquids and did not handle strong acids or bases. A beaker was used to evaporate solutions to dryness instead of an evaporating dish. She had no trouble reading thermometers, graduated cylinders, or determining the volume of a gas in a gas-measuring tube. It was found that a buret which uses rubber tubing and a glass bead to control the flow of solution was best suited for her use. She found it difficult at first to prepare ball-and-stick models of organic molecules; however, it was felt that with additional practice she would have done much better. Her problem with ball-and-stick models was complicated by the poor fit of the components (too loose or too tight); however, this is a problem that plagues all students!

Throughout the semester the assistant did most of the assembly of the apparatus and manipulated much of the smaller equipment. Both the student and I were well-satisfied by her achievement in the laboratory. Both of us agreed that the experience was worth the effort and that almost all the course objectives, including developing proper laboratory techniques, discovering regularities and forming conclusions based on laboratory data, and solving problems in a logical manner, were met. We also learned an additional lesson: she could do more in the laboratory than she or I (or the assistant) had believed at the beginning of the semester.