OVERCOMING BARRIERS OF HANDICAPPED STUDENTS
TO PARTICIPATING IN SCIENCE ACTIVITIES

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Redden, et al (1) identified four types of barriers handicapped students encountered that have kept them from participating in science activities. These are: environmental barriers, attitudinal barriers, communication barriers and informational barriers.

 Teachers, counselors, parents and handicapped students themselves often have negative attitudes toward the student's participation in science courses. They worry that the handicapped student may be physically, mentally or emotionally unable to do the work; or that efforts to accommodate handicapped students will result in the neglect of normal classmates.

 These attitudinal barriers may be overcome by encouraging active participation by handicapped students and by providing supplemental training for them if it is needed.

 Speech impairments of students with cerebral palsy cause lack of involvement with the instructor. Deaf students often have difficulty understanding and being understood. They may also have difficulty understanding abstractions. Blind students have difficulties with written assignments. These communication barriers can be overcome by the use of student notetakers, use of concrete examples to explain ideas, use of audio tapes by blind students, and spending time informally visiting with students who have speech difficulties to better understand their speech.

 Teachers need to know where to go for help to break down informational barriers. A bibliography of such sources is available from the authors.

 Environmental barriers result from such problems as inadequate room for maneuver, benches that are too high, controls that are inaccessible, and inadequate labeling. Usually only minor adaptations are required to remove environmental barriers.

 The key to success with handicapped students is flexibility and creativity. The students are the experts on their handicaps and should be consulted to determine what they can do for themselves, what they can do with minor changes, and what aspects of the course will require major adaptation.

 Diagnose the problem, examine your lesson plan for strengths and weaknesses related to the particular handicap of your student, and use common sense in your changes.

(1) Science for Handicapped Students in Higher Education. Martha Ross Redden, Cheryl Arlene Davis and Janet Welsh Brown. 1978. American Association for the Advancement of Science Publication 78-R-2

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FIELD BIOLOGY FOR PHYSICALLY HANDICAPPED STUDENTS

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Adapting a field biology course to handicapped students need not be the overwhelming experience you may expect. At a National Science Foundation sponsored two-week field biology course for physically handicapped students, co-directed by Dr. Mary Jane Sullivan and me last summer, a basic ecology curriculum was taught to twenty-six hearing-impaired, vision-impaired and orthopedically-impaired students at the Touch of Nature Environmental Center at Southern Illinois University at Carbondale.

Our format was a morning lecture, mid-morning field activity, recreation after lunch, afternoon field activity and evening film. Adaptations similar to those we made to
accommodate our students can be used in any biology course to enhance the educational opportunities for handicapped students. All of our handicapped students benefited from having a note taker and from having written directions the day before each exercise was begun.

Other simple adaptations made in the lecture included having a sign interpreter for the deaf students and using an overhead projector instead of a blackboard so they could read the lecturer's lips. Concrete examples of abstract ideas were included. The overhead projector also helped vision impaired students. Blind students taped the lectures.

Most of our effort was put into field experiences, which were made accessible to students in wheelchairs by providing adequate muscle power to push them across rough terrain and carry them into and out of cars, busses, boats, and canoes. We found that with extra effort and care they could go everywhere the rest of us went—even rapelling over a sixty foot cliff. Some of these students could help with many of the field exercises if they were taken out of their chairs and put on the ground. Large knobs on microscopes helped, as did lap boards for the scopes. Some of the orthopedically-impaired and vision-impaired students found writing easier with newsprint and felt-tipped pens.

An effort was made to increase the use of touch and smell. Both the blind, who tend to have narrow understanding of the physical world, and deaf, who sometimes have difficulty with abstraction, seemed to benefit from this effort. Braille labels on bottles and lab equipment enabled blind students to perform nearly all of the activities.

The students were given pretests and posttests and showed considerable improvement in their scores after only two weeks. The low pretest scores told us that these handicapped students had poor backgrounds in science. Their active participation during the course and the improvement they showed on the posttest persuaded us that they can be included in normal science courses with minimum adjustment, and when included with do as well and as poorly as those without physical handicaps.

THE JANUARY INTERIM PLUS NCEP AT CARROLL COLLEGE

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17 years ago Carroll College undertook a college wide study of its curriculum. After reviewing many possibilities, the faculty voted (not unanimously) to go to the 4-1-4. This format seemed to provide opportunities to make innovative changes that would be more in line with a liberal arts education for the turbulent 60's.

Of particular interest to a number of the faculty was the January Interim. This time slot seemed to provide an outlet for field experiences not normally found in a semester program by providing for a time other than summer when students were involved with jobs, etc.

The early "off campus" trips were financed entirely by the students. These monies were required in addition to those of tuition, fees, room and board. The scope of programs ranged from Moscow, Russia to Jamaica and involved departments of Political Science, History, Art, Biology, English, Economics and Foreign Languages. The off campus experiences were limited to those students with Junior or Senior standing. It was obvious that it would be impossible for all Carroll upperclass students to take part in this program. Therefore, an "on campus" program had to be developed for the underclass students plus the Juniors and Seniors unable to afford the additional costs. It was decided to provide courses on campus built around a theme. Each department would provide a departmentally constructed theme-related course. In the early years there were 25 on campus "theme" courses and 6 to 10 off campus courses.

As the "off campus" courses evolved, it became apparent that those who were able to afford the added costs were not always the students who would benefit the most from these experiences. In fact the "off campus" courses were fast becoming the "rich kids" classes.

After much discussion and many meetings with the administration and Board of Trustees, a way was developed to allow all Carroll students the opportunity to take part in the January "off campus" courses. The Foreign Student Scholarship fund, an increase in tuition and a start-up grant provided funds for the first NEW CULTURAL EXPERIENCES PROGRAM. This