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ABSTRACT

This brief paper provides specific suggestions to help science teachers make the necessary accommodations to include students with disabilities in science instruction. Suggestions are organized under the two broad headings of difficulties in gaining knowledge and difficulties in demonstrating knowledge. Under each category specific student learning difficulties are paired with several possible accommodations. Examples include: student difficulty with taking notes in class because of a mobility or visual impairment can be accommodated by in-class access to a computer with adaptive technology and a word processor; student difficulty with completing an assignment because of a health impairment can be accommodated with flexible scheduling arrangements; and student difficulty completing a test or assignment because of a disability that affects speed can be accommodated by extra time or alternative testing arrangements. The paper also lists contact and other information resources associated with Project DO-IT at the University of Washington. (DB)

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Working Together: Science Teachers and Students with Disabilities

Disabilities
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Working Together: Science Teachers and Students with Disabilities

As scientific fields make increasing use of technology, new opportunities emerge for people with a variety of abilities. When students with disabilities and science teachers form learning partnerships, the possibilities for academic and career success multiply.

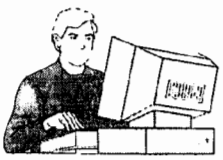
Some students with disabilities have conditions that are invisible; some are visible. Since each person's situation is unique, the best solutions for maximizing participation come about when the student and teacher work together to develop creative alternatives for challenges faced by students with disabilities. Such challenges include gaining knowledge and demonstrating knowledge. In most cases, it takes just a little creativity, patience, and common sense to make it possible for everyone to learn and contribute.

Gaining Knowledge

Many students with disabilities face challenges to gaining knowledge. Examples of specific challenges and accommodations follow.

The student who has difficulty...	can be accommodated by...
...reading standard text or graphics due to visual impairment	...materials in large print or Braille, on tape, or via computer; enlarged or tactile drawings; access to adaptive technology that provides enlarged, voice, and/or Braille output.
...seeing materials on blackboard or overhead projector due to visual impairment	...binoculars; verbalization of the content and oral descriptions of all visually displayed materials.
...reading output from standard equipment because of visual impairment	...interfacing lab equipment with computer and providing large print and/or speech output; scientific equipment with Braille and large print markings.
...hearing presentations and instructions	...FM system; interpreter; printed materials; facing student for lip reading; overhead projector or blackboard.
...hearing multimedia and videotaped presentations	...captioned presentations; interpreter.
...participating in class discussions due to hearing or speech impairment	...electronic communications (e.g., Internet) where the ability to hear or speak is not required; portable computer with speech output.

...understanding concepts due to a specific learning disability	...visual, aural, and tactile demonstrations incorporated into instruction.
...reading because of a specific learning disability	...extra time and access to materials via a computer equipped with speech and large print output and Internet access.
...taking notes in class because of mobility or visual impairment	...in-class access to a computer with adaptive technology and a word processor.
...operating lab equipment and conducting lab experiments due to mobility impairment	...accessible facility; adjustable-height tables; lab partner; scribe; computer-controlled lab equipment with alternative input devices (e.g., speech, Morse code, alternative keyboard); modified scientific equipment.
...seeing demonstrations while seated in a wheelchair; viewing lab experiments	...adjustable height tables and flexible seating arrangements.
...completing an assignment or lab because of a health impairment	...flexible scheduling arrangements.
...doing research	...information accessible on computer (disk, Internet) with adaptive technology.



Demonstrating Knowledge

Some students with disabilities cannot demonstrate mastery of a subject by writing, speaking, or by working through a problem in a lab. Many of the accommodations for gaining knowledge can help the student demonstrate mastery of a subject as well. Examples of other accommodations follow.

The student who has difficulty...	**can be accommodated by...**
...completing and submitting worksheets and tests because of visual impairment and/or specific learning disability	...worksheets and tests in large print or Braille, on tape, or via computer; access to adaptive technology that provides enlarged, voice and/or Braille as well as standard print output.
...completing a test or assignment because of a disability that affects the speed at which it can be completed	...extra time or alternative testing arrangements.
...completing a test or assignment because of the inability to write	...in-class access to a computer with alternative input (e.g., Morse code, speech, alternative keyboard) devices.

Electronic Resources

- To contact staff, request electronic copies of DO-IT NEWS, request publications or ask questions about the program, send electronic mail to *doit@u.washington.edu*
- To send a message to all DO-IT Scholars, DO-IT Pals, or DO-IT Mentors, send electronic mail to one of the following addresses:
  doitkids@u.washington.edu
  doitpals@u.washington.edu
  mentors@u.washington.edu
- To discuss issues pertaining to individuals with disabilities and their pursuit of science, engineering, and mathematics (sem) academic programs and careers, subscribe to the doitsem LISTPROC discussion list by sending electronic mail to *listproc@u.washington.edu.*
  In the message text type "subscribe doitsem" followed by your name.
- For information resources related to DO-IT, disabilities, adaptive technology, science, engineering, mathematics, and postsecondary education, access the DO-IT World Wide Web pages at *http://www.washington.edu/doit/*

Videotape

A 13-minute videotape, *Working Together: Science Teachers and Students With Disabilities,* may be ordered by sending a $20 check to DO-IT.

Grants and gifts fund DO-IT publications, videotapes, and programs to support the academic and career success of people with disabilities. Contribute today by sending a check to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Your gift is tax deductible as specified in IRS regulations. Pursuant to RCW 19.09, the University of Washington is registered as a charitable organization with the Secretary of State, State of Washington. For more information, call the Office of the Secretary of State, 800-322-4483.

About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) serves to increase the successful participation of individuals with disabilities in challenging academic programs such as those in science, engineering, mathematics and technology. Primary funding for the DO-IT program is provided by the National Science Foundation, the U.S. Department of Education, and the State of Washington. Additional grants have been received from Mitsubishi Electric America Foundation, NEC Foundation of America, the Seattle Foundation, the Telecommunications Funding Partnership, US WEST Communications, Visio Corporation, the Washington State Office of Superintendent of Public Instruction, the AOL Foundation, the Samuel S. Johnson Foundation, the Jeld-Wen Foundation, and Microsoft. The University of Washington also contributes substantial resources to this project. This material is based upon work supported by the National Science Foundation under Grant Nos. 9255803 and 9550003. Any questions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation. For further information, to be placed on the DO-IT mailing list, or to request materials in alternative format, contact:

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