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ABSTRACT

In the early 1980's a number of reports on the status of science and mathematics education were published, making evident declining science and mathematics achievement, dropping enrollment, and a shortage of qualified teachers. In April 1983 the National Commission on Excellence in Education presented its report to President Reagan. The report, entitled "A Nation at Risk: The Imperative for Educational Reform," compared the quality of teaching and learning in schools and colleges in the United States with those of other advanced nations. The report became the focus of nationwide media attention. This sparked renewed federal involvement in science and mathematics education, school/industry coalitions were set up, and a call for help was issued to all interested parties. Concerned with the scientific literacy of their employees and their future employees, business and industry offered assistance in a number of ways. This guide is designed to complement other bibliographies on the topic and is not meant as a comprehensive bibliography on the topic. Categories include: (1) "Introductions to the Topic"; (2) "Subject Headings"; (3) "Basic Texts"; (4) "Related and Specialized Texts"; (5) "Bibliographies"; (6) "Selected Conference Proceedings"; (7) "Statistical Information"; (8) "Selected Statistical Sources"; (9) "Government Publications and Reports"; (10) "Selected Government Publications and Reports"; (11) "Abstracting and Indexing Services"; (12) "Journals"; (13) "Representative Articles"; (14) "Selected Materials"; and (15) "Sources of Additional Information." (CW)

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THE CRISIS IN SCIENCE EDUCATION

Compiled by Michelle Cadoree

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SCOPE: In the early 1980's a number of reports on the status of science and mathematics education were published, making evident declining science and mathematics achievement, dropping enrollment, and a shortage of qualified teachers. In April 1983 the National Commission on Excellence in Education presented its report to President Reagan. The report, entitled **A Nation at Risk: the Imperative for Educational Reform**, compared the quality of teaching and learning in America's schools and colleges with those of other advanced nations. **A Nation at Risk** became the focus of nationwide media attention. This sparked renewed federal involvement in science and mathematics education, school/industry coalitions were set up, and a call for help was issued to all interested parties. Concerned with the scientific literacy of their employees and their future employees, business and industry offered assistance in a number of ways--providing money, training, equipment, competitions, and other cooperative efforts.

This present guide complements LC Science Tracer Bullet 75-5, **Science Education in America**, which provides a historical overview. Not meant to be a comprehensive bibliography, this is designed--as the name of the series implies--to put the reader "on target."

INTRODUCTIONS TO THE TOPIC

Johnston, Karen L., and Bill G. Aldridge. The crisis in science education: what is it? how can we respond? **Journal of college science teaching**, v. 14, Sept./Oct. 1984: 20-28. **Pamphlet box*** and **Q183.U6J68**

Press, Frank. Closing in on the math and science gap. In **Science year**. Chicago, World Book, Inc., 1985. p. 1[illegible]-209. **Pamphlet box*** and **Q9.S33 1985***

Seaborg, Glenn T. The crisis in pre-college science and math education. **Skeptical inquirer**, v. 14, spring 1990: 270-275. **BF1001.S47**

* **Available in reference collection, Science Reading Room**

United States. Congress. Office of Technology Assessment. **Educating scientists and engineers: grade school to grad school.** Washington, U.S. Govt. Print. Off., 1988. 128 p.
"OTA-SET-377." **Q183.3.A1E38 1988***

Examines the forces associated with elementary and secondary education that shape the talent pool, traces pathways to undergraduate and graduate education in science and engineering, and presents a discussion of policy areas for possible congressional action, developed under two strategies, labeled 'retention' and 'recruitment.'

SUBJECT HEADINGS used by the Library of Congress, under which books on science education can be located in the Library's card, book, and online catalogs, include the following:

SCIENCE AND STATE--UNITED STATES (Highly relevant)
SCIENCE--STUDY AND TEACHING (ELEMENTARY)--UNITED STATES (Highly relevant)
SCIENCE--STUDY AND TEACHING (HIGHER)--UNITED STATES (Highly relevant)
SCIENCE--STUDY AND TEACHING (SECONDARY)--UNITED STATES (Highly relevant)
See also specific disciplines, e.g., ENGINEERING, MATHEMATICS, TECHNOLOGY followed by the subdivisions --STUDY AND TEACHING--UNITED STATES
SCIENCE--STUDY AND TEACHING (Relevant)
SCIENCE--STUDY AND TEACHING--LAW AND LEGISLATION--UNITED STATES (Relevant)
SCIENCE--STUDY AND TEACHING--UNITED STATES (Relevant)
SCIENTISTS--EDUCATION--UNITED STATES (Relevant)
TECHNOLOGY AND STATE--UNITED STATES (Relevant)
EDUCATION AND STATE--UNITED STATES (Related)
SCIENTISTS--SUPPLY AND DEMAND--GOVERNMENT POLICY--UNITED STATES (Related)
TECHNICAL EDUCATION--UNITED STATES (Related)
EDUCATION--UNITED STATES--EVALUATION (More general)

BASIC TEXTS

Criteria for excellence. Washington, National Science Teachers Association, c1987. 39 p.
Q183.3.A1C75 1987

Development and dilemmas in science education. Edited by Peter Fensham. London, New York, Falmer Press, 1988. 318 p. (Contemporary analysis in education series, 23)
Q121.D48 1988

Everybody counts: a report to the nation on the future of mathematics education. Mathematical Sciences Education Board and Board on Mathematical Sciences, Committee on the Mathematical Sciences in the Year 2000, National Research Council. Washington, National Academy Press, 1989. 114 p. QA13.E94 1989
Bibliography: p. 99-113.

National Science Board (U.S.). Commission on Precollege Education in Mathematics, Science, and Technology. **Educating Americans for the 21st century: a plan of action for improving mathematics, science, and technology education for all American elementary and secondary students so that their achievement is the best in the world by 1995: a report to the American people and the National Science Board.** Washington, National Science Board Commission on Precollege Education in Mathematics, Science, and Technology, 1983. 124 p. QA13.N38 1983 SSRR
Bibliography: p. 102-103.
----- ----- Source materials. Washington, National Science Board Commission on Precollege Education in Mathematics, Science, and Technology, 1983. 251 p.
QA13.N38 1983 Source Materials SSRR

Project 2061. Phase I of the AAAS initiative on scientific literacy, Project 2061 established a base for reform by spelling out the knowledge, skills, and attitudes that all students should acquire as a consequence of their total school experience from kindergarten through high school. The following six reports, listed in order of AAAS publication number, are the product of Phase I of Project 2061.

Science for all Americans: a Project 2061 report on literacy goals in science, mathematics, and technology. Washington, American Association for the Advancement of Science, 1989. 217 p. (AAAS publication, 89-01S)
Bibliography: p. 195-199. Q183.3.A1S355 1989*

Clark, Mary E. **Biological and health sciences: report of the Project 2061 Phase I Biological and Health Sciences Panel.** Washington, American Association for the Advancement of Science, 1989. 33 p. (AAAS publication, 89-02S)
Q181.A1A68, no. 89-02S

Project 2061 (American Association for the Advancement of Science). Phase I Mathematics Panel. **Mathematics: report of the Project 2061 Phase I Mathematics Panel.** David Blackwell and Leon Henkin [panel cochairs]. Washington, American Association for the Advancement of Science, 1989. 47 p. (AAAS publication, 89-03S) Q181.A1A68, no. 89-03S

SSRR = Social Science Reading Room

Project 2061 (American Association for the Advancement of Science). Phase I Physical and Information Sciences and Engineering Panel. **Physical and information sciences and engineering: report of the Project 2061 Phase I Physical and Information Sciences and Engineering Panel.** George Bugliarello [panel chair]. Washington, American Association for the Advancement of Science, 1989. 41 p. (AAAS publication, 89-04S) **Q181.A1A68, no. 89-04S**

Appley, Mortimer H., and Winifred B. Maher. **Social and behavioral sciences: report of the Project 2061 Phase I Social and Behavioral Sciences Panel.** Washington, American Association for the Advancement of Science, 1989. 55 p. (AAAS publication, 89-05S) **Q181.A1A68, no. 89-05S**
Includes bibliographical references.

Johnson, James R. **Technology: report of the Project 2061 Phase I Technology Panel.** Washington, American Association for the Advancement of Science, 1989. 32 p. (AAAS publication, 89-06S) **Q181.A1A68, no. 89-06S**

Science & engineering education for the 1980's & beyond. Prepared by the National Science Foundation & the Department of Education. Washington, The Foundation, U.S. Govt. Print. Off., 1980. 82 p. **Q183.3.A1S35**
Includes bibliographies.

RELATED AND SPECIALIZED TEXTS

Alliance for excellence: librarians respond to A Nation at Risk: recommendations and strategies from libraries and the learning society. Washington, U.S. Dept. of Education, Office of Educational Research and Improvement, Center for Libraries and Education Improvement; U.S. Govt. Print. Off., 1984. 64 p. **Z718.A36 1984**

American Council on Education. Business-Higher Education Forum. **America's competitive challenge: the need for a national response. A report to the President of the United States from the Business-Higher Education Forum.** Washington, American Council on Education, Business-Higher Education Forum, 1983. 51 p. **LC1085.A45 1983**
Includes bibliographical references.

America's schools: passing the test of the 80's? Editor, Carol C. Collins. New York, Facts on File Publications, c1985. 231 p. **LA217.A785 1985**
A compilation of newspaper editorials that follow the debate over the crisis in education.

Blacks, science, and American education. Edited by Willie Pearson, Jr., and H. Kenneth Bechtel. New Brunswick, Rutgers University Press, c1989. 174 p.
Bibliography: p. 153-165. **Q149.U5B57 1989**

Committee on Science and Mathematics Education. **Recommendations for improving the quality of science and mathematics education in North Carolina's public schools.** Raleigh, N.C., Committee on Science and Mathematics Education of the North Carolina Board of Science and Technology and the State Dept. of Public Instruction, 1982. 70 p. Q183.3.N8C66 1982
Includes bibliographical references.

Lee, Valerie E., and Carolee Stewart. **National assessment of educational progress proficiency in mathematics and science, 1985-86: Catholic and public schools compared: final report 1989.** Washington, National Catholic Educational Association, c1989. 66 p. QA13.L44 1989
Includes bibliographical references.

Libraries and the learning society: papers in response to A Nation At Risk. Richard M. Dougherty and others. Chicago, American Library Association, 1984. 146 p. Z675.S3L44 1984

United States. Dept. of Education. **The nation responds: recent efforts to improve education.** Washington, U.S. Govt. Print. Off., 1984. 229 p. LA217.U54 1984

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Gratch, Bonnie G. Five years after A Nation at Risk: an annotated bibliography. **RSR: reference services review**, v. 17, winter 1989: 29-48. Z1035.1.R43 and Pamphlet box*

Schroeder, Eileen E. **Science education.** Phoenix, Ariz., Oryx Press, 1986. 103 p. (Oryx science bibliographies, 6) Z5818.S3S34 1986*

SELECTED CONFERENCE PROCEEDINGS

High-school biology: today and tomorrow. Committee on High-School Biology Education, Board on Biology, Commission on Life Sciences, National Research Council. Walter G. Rosen, editor. Washington, National Academy Press, c1989. 346 p. QH315.H615 1989
Papers presented at a conference held Oct. 1988, Washington, D.C.

National Forum on Educational Reform (1984: San Francisco, Calif.). **Excellence in our schools: making it happen: conference proceedings of a National Forum on Educational Reform held in San Francisco. March 14-16, 1984.** New York, College Entrance Examination Board, 1985. 95 p. LA210.N3335 1984

Natural partners: how science centers and community groups can team up to increase science literacy. Washington, Association of Science-Technology Centers, 1987. 23 p.
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Proceedings of a workshop held in September 1986; sponsored by ASTC and the American Association for the Advancement of Science, Office of Opportunities.
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Science and technology education and future human needs. Edited by J. L. Lewis and P. J. Kelly. Oxford, Eng., New York, Published for the ICSU Press by Pergamon Press, 1987. 185 p. (Science and technology education and future human needs, v. 1.)
Q181.S82 1987

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Includes bibliographies.

Science education in a high technology society: proceedings of a conference. Sponsored by Boston University for the National Science Teachers Association of the United States and the Association for Science Education of the United Kingdom, March 31-April 2, 1984, Boston, Massachusetts. Edited by Albert G. Medvitz. Boston, Boston University, c1985. 335 p.
Q181.A1S35 1985

Includes bibliographies.

STATISTICAL INFORMATION can be located in the following indexes:

American Statistics Index (1974-) Z7554.U5A46 MicRR, N&CPR, SSRR
See: Higher Education
Scientific Education
Vocational Education and Training

Statistical Reference Index (1980-) Z7554.U5S73 MRR, MicRR, N&CPR, SSRR
See: Scientific Education
Technical Education
Vocational Education and Training

MicRR = Microform Reading Room
MRR = Main Reading Room
N&CPR = Newspaper and Current Periodicals Reading Room

SELECTED STATISTICAL SOURCES

Science & engineering indicators. Washington, National Science Board, U.S. Govt. Print. Off., 1987- **Q172.5.S34S34***
Continues **Science Indicators** (1972-1986) Q172.5.S34S36

Science and technology data book. Washington, National Science Foundation, Division of Science Resources Studies, 1983- **Pamphlet box***
Distributed annually by NTIS in its PB series, e.g., 1989 edition, PB89-231765**

GOVERNMENT PUBLICATIONS AND REPORTS can be located in the following indexes:

CIS Index to Publications of the United States Congress (1970-) KF49.C62 MicRR, N&CPR, SSRR
See: Engineering
Federal Aid to Education
Mathematics
Scientific Education

Government Reports Announcements & Index (1946-) Z7916.G78*
See: Engineering Education
Mathematics Education
Science Education

Monthly Catalog of United States Government Publications (1895-) Z1223.A18* N&CPR
See: Education--Science
Engineering--Study and Teaching--United States
Mathematics--Study and Teaching--United States
Science--Study and Teaching--United States
Science--Study and Teaching (Higher)--United States
Science--Study and Teaching (Secondary)--United States
Science and State--United States
Science Teachers--United States--Supply and Demand

Resources in Education (RIE) (1966-) Z5813.R4 SSRR
See: Science Education
Science Teachers
Scientific Literacy

** Available in the microform collection, Science Reading Room

SELECTED GOVERNMENT PUBLICATIONS AND REPORTS

Davey, Micheal E., Edith Fairman Cooper, and Christine Matthews Rose. **Brick and mortar: a summary and analysis of proposals to meet research facilities needs on college campuses: report prepared by the Congressional Research Service, Library of Congress, for the Subcommittee on Science, Research, and Technology; transmitted to the Committee on Science, Space, and Technology, House of Representatives, One Hundredth Congress, first session.** Washington, U.S. Govt. Print. Off., 1987. 160 p.
Q180.6.U54D38 1987

Equity and excellence: a dual thrust in mathematics and science education. Model state education agency efforts. Washington, Council of Chief State School Officers, 1987. 35 p.
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United States. Congress. House. Committee on Science and Technology. **H.R. 1310, Emergency Mathematics and Science Education Act: hearings before the Committee on Science and Technology, House of Representatives, Ninety-eighth Congress, first session, February 9, 16, 1983.** Washington, U.S. Govt. Print. Off., 1984. 329 p.
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Augments OTA's report, **Educating Scientists and Engineers: Grade School to Grad School**, focusing on the factors that prompt students to plan science and engineering careers during elementary and secondary education, and the early stages of higher education.

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ABSTRACTING AND INDEXING SERVICES that index literature relating to science education are listed below. Some suggested terms are given as aids in searching.

Applied Science & Technology Index (1913-) Z7913.I7* and CD-ROM*
See: Education--United States
Elementary Education
Engineering Education
Education and Industry

Current Index to Journals in Education (1969-) Z5813.C8 SSRR
See: Science Education
Science Instruction
Science Instructors
Scientific Literacy

Note: Consult reference librarian for location of abstracting and indexing services in the Science Reading Room.

Education Index (1929-) Z5813.E23 SSRR
See: Science--Curriculum
Scientific Literacy

General Science Index (1978-) Z7401.G46*
See: Education--United States
Science--Social Aspects
Science and State--United States
See also subheading 'Study and Teaching' under specific subject disciplines, e.g. Engineering--Study and Teaching.

Readers' Guide to Periodical Literature (1900-) AI3.R48 SSRR
See: Science--Study and Teaching
Science and State
Scientific Literacy

JOURNALS that often contain articles relevant to science education in the United States include:

Journal of College Science Teaching Q183.U6J68
Journal of Research in Science Teaching Q181.A1J6
Phi Delta Kappan LJ121.P4
School Science and Mathematics Q1.S28
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REPRESENTATIVE ARTICLES

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Blosser, Patricia E. What research says: achievement in science. School science and mathematics, v. 84, Oct. 1984: 514-521. Q1.S28

Brown, George E. Project 2061: a congressional view. Science, v. 245, July 28, 1989: 340. Q1.S35

Bybee, Rodger, and Robert E. Yager. Perceptions of professional problems, proposed solutions and needed directions in science education. School science and mathematics, v. 82, Dec. 1982: 673-681. Q1.S28

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Massey, Walter E. Science education in the United States: what the scientific community can do. **Science**, v. 245, Sept. 1, 1989: 915-921. **Q1.S35**

Ploch, Margie. Rebuilding math and science education: business lends a hand. **High technology**, v. 4, Oct. 1984: 69-72. **T1.H5**

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Scientific literacy. [Boston, Mass.] American Academy of Arts and Sciences. 1983. 251 p. (**Daedalus**, v. 112, spring 1983) **Q11.B7**, v. 112

Contents: Scientific literacy and economic productivity in international perspective, by H. J. Walberg.--Scientific literacy: a conceptual and empirical review, by J. D. Miller.--Scientific illiteracy and democratic theory, by K. Prewitt.--Nature closely observed, by D. Hawkins.--Achieving wider scientific literacy, by A. B. Arons.--Science education: a framework for decision-makers, by M. B. Rowe.--The reform of science education: a cautionary tale, by P. W. Jackson.--The improvement of science teaching, by J. M. Atkin.--Human genetics; one approach to scientific literacy, by B. Childs and F. Hickman.--The case of computer literacy, by J. G. Kemeny.--Nothing to fear, much to do, by S. R. Graubard.

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Q181.A1J6

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Woo, Louis K. The shortage of mathematics and science teachers: lessons from higher education. **Educational evaluation and policy analysis**, v. 7, winter, 1985: 383-393.

SOURCES OF ADDITIONAL INFORMATION

American Association for the Advancement of Science
Directorate for Education and Human Resources Programs
1333 H Street, NW
Washington, D.C. 20005
Telephone: (202) 326-6620
(Publishes **Sourcebook for Science, Mathematics & Technology Education** (formerly **AAAS Science Education Directory**) and **Science Education News**)

ERIC Clearinghouse for Science, Mathematics, and Environmental Education
Ohio State University
1200 Chambers Road
Columbus, Ohio 43212
Telephone: (614) 292-6717

National Science Foundation,
Directorate for Science Education
1800 G St, NW
Washington, D.C. 20550
Telephone: (202) 357-7557

National Science Teachers Association (NSTA)
1742 Connecticut Avenue, NW
Washington, D.C. 20009
Telephone: (202) 328-5800
(Publishes **NSTA Yearbook** and **NSTA Handbook**)