

# ED298073 1988-09-00 Science/Technology/Society in the Social Studies. ERIC Digest.

ERIC Development Team

[www.eric.ed.gov](http://www.eric.ed.gov)

## Table of Contents

If you're viewing this document online, you can click any of the topics below to link directly to that section.

<a href="#">Science/Technology/Society in the Social Studies. ERIC Digest.....</a>	<a href="#">2</a>
<a href="#">WHAT ARE SOME MAJOR THEMES OF STS IN SOCIAL STUDIES EDUCATION?.....</a>	<a href="#">2</a>
<a href="#">WHAT IS THE RATIONALE FOR INCLUDING CONTENT ON STS IN THE SOCIAL.....</a>	<a href="#">3</a>
<a href="#">WHAT CAN BE DONE TO INFUSE STS INTO THE SOCIAL STUDIES CURRICULUM?.....</a>	<a href="#">4</a>
<a href="#">REFERENCES AND ERIC RESOURCES.....</a>	<a href="#">6</a>
<a href="#">SCIENCE/TECHNOLOGY/SOCIETY: A FRAMEWORK FOR CURRICULUM.....</a>	<a href="#">6</a>
<a href="#">TECHNOLOGY, AND SOCIETY IN THE EDUCATION OF CITIZENS.....</a>	<a href="#">6</a>
<a href="#">CITIZENSHIP EDUCATION: TEACHING ABOUT OUR LEGACY FROM THE.....</a>	<a href="#">7</a>
<a href="#">ED.....</a>	<a href="#">7</a>



**ERIC Identifier:** ED298073  
**Publication Date:** 1988-09-00  
**Author:** Heath, Phillip A.

**Source:** ERIC Clearinghouse for Social Studies/Social Science Education Bloomington IN.

## Science/Technology/Society in the Social Studies. ERIC Digest.

THIS DIGEST WAS CREATED BY ERIC, THE EDUCATIONAL RESOURCES INFORMATION CENTER. FOR MORE INFORMATION ABOUT ERIC, CONTACT ACCESS ERIC 1-800-LET-ERIC

A current trend in social studies education is concern about the relationships of science and technology to human societies in the past and present. The National Council for the Social Studies and the Social Science Education Consortium, for example, have sponsored activities and publications to bring about improvement in teaching and learning about science and technology as powerful shapers of our modern world. Other advocates of education about science and technology in society include the National Science Teachers Association, Carnegie Foundation for the Advancement of Teaching, American Association for the Advancement of Science, and the National Endowment for the Humanities. Given the advocacy of national leaders, there appears to be a movement to infuse science- and technology-related topics and issues into the curricula of elementary and secondary schools. There is little evidence, however, of widespread classroom adoption of content about science/technology/society (STS).

Current efforts to promote science/technology/society in elementary and secondary schools will not succeed unless educators know what education on STS is, why it is an important part of education in the social studies, and how to include it in the curriculum. This ERIC Digest focuses on (1) major themes in education on STS, (2) the rationale for emphasizing STS in the social studies, and (3) how to include STS in the curriculum.

### WHAT ARE SOME MAJOR THEMES OF STS IN SOCIAL STUDIES EDUCATION?

Education on STS involves, first of all, consideration of the various interactions of science and technology in a social context. Science and technology affect and are affected by the institutions and values of a society. The following examples of major STS themes suggest the compatibility of teaching and learning about science/technology/society with education in the social studies.

1. Critical Public Issues that Affect the Well-Being of Individuals and Societies Throughout the World. Societies of our modern world are increasingly propelled and changed by advances in science and technology, which generate critical public issues. These issues pertain to such matters as the technical efficiency and public safety of nuclear power plants, the hazards of recombinant DNA research and genetic engineering, and the perils posed by modern weapons. A study by Bybee and Mau

(1986) indicates that science educators perceive the most important STS problem in our world to be world-wide hunger, unchecked population growth, declining air quality, depletion of water resources, and the destructive capacity of modern weapons systems.

2. Processes and Skills in Thinking about Critical Public Issues Associated with Science and Technology. Education about STS issues involves development of higher-order cognitive abilities associated with processes of decision making, problem solving, and critical thinking. Students who confront science- and technology-related social issues have opportunities to inquire about alternatives and their consequences in the process of making rational and defensible choices.

3. The Utility of Trade-offs in Decision Making on STS Issues. Public issues anchored in scientific and technological applications to society often involve trade-offs between conflicting values in which there is no clear view of right or wrong. Many environmental issues, for example, may involve a compromise or trade-off among conflicting value positions (e.g., limiting pollution sufficiently to protect health and environment while still maintaining a satisfactory level of production and employment). Students are required to think in terms of "more" or "less" of one thing or another instead of making an uncompromising choice of "either" one thing "or" another.

4. Knowledge and Skills in Civic Action. The emphasis here is on an individual's capability and willingness to participate in civic decision making about STS issues and to act upon these decisions. Opportunities are provided for testing proposed actions through civic participation. While simulations and role-play activities are included in most STS units of instruction, there is also need for civic action projects that are consistent with school-district rules and regulations.

5. Interrelationship and Integration of Knowledge and Cognitive Process Skills from Several Academic Disciplines. STS issues cut across disciplinary boundaries, such as biology, geology, geography, history, and political science. Students and teachers are required to flexibly apply content from various subjects to inquire about issues and make warranted choices in responses to them.

## WHAT IS THE RATIONALE FOR INCLUDING CONTENT ON STS IN THE SOCIAL

STUDIES CURRICULUM?The argument for emphasizing STS in the social studies curriculum is based on a primary goal of American elementary and secondary schools--education for responsible citizenship in a constitutional democracy. In order to properly address this goal in today's world, educators must emphasize the pervasive, powerful effects of science and technology in society. Citizens of a modern constitutional democracy can neither perceive current events and issues accurately, nor think clearly about them, nor act responsibly and effectively on them unless they know

about science and technology as powerful cultural forces that have shaped these critical events and issues. This kind of general education for citizenship is likely to help students from all social groups understand more fully their own civilization and its connections to the world and to participate more responsibly in the democratic process.

Common memory--widespread knowledge of the heritage of a society--is an important aspect of citizenship, to which education on STS makes a solid contribution. Scientific and technological advances are an integral part of the heritage of citizens of the United States, and they will continue to shape the development of our world. Considering that an understanding of this heritage is a critical component of citizenship education, the social studies curriculum of elementary and secondary school should include a historical to present-day perspective on relationships of scientific and technological effects to the development of society.

The ability of citizens to make informed, rational decisions is a fundamental goal of American education, which is directly linked to understanding of public issue related to societal applications of science and technology. If the social studies curriculum includes an emphasis on the interactions of science, technology, and society, and the decisions that citizens make in their social and personal lives in terms of these interactions, then students are likely to develop capabilities that enable them to act responsibly and effectively as members of local, national, and global communities.

Ability to connect information and ideas within and between academic disciplines and to link different fields of knowledge is a key to high-level understanding of social reality. Education for responsible and competent citizenship in a increasingly complex technological society requires that students be able to synthesize and apply knowledge from many disciplines. Every discipline in the social studies can be basically connected to content on science and technology in society. To ignore this reality will limit students' abilities to comprehend their world and to act effectively within it. Thus, content on STS must be connected to the study of geography, economics, political science, history, and other subjects in the social studies curriculum to help students make connections among facts and ideas needed for responsible citizenship in today's world. Furthermore, content on STS in the social studies curriculum can and should be connected to education on science/technology/society in the science curriculum.

## WHAT CAN BE DONE TO INFUSE STS INTO THE SOCIAL STUDIES CURRICULUM?

Attempts to "place" or infuse STS into the curriculum can be considered in terms of three categories:

- Infusion into existing courses of study.
  
- Extension of an existing unit of study.

-- Creation of a separate course of study.

1. Infusion into Existing Courses of Study. Using this approach, teachers systematically and pervasively add content on STS to a course on history, geography, or civics, for example. One advantage of this approach is that STS content, and materials and teaching methods associated with it, become part of the standard curriculum; therefore they are more likely to be accepted as an ongoing part of the school's mission. The disadvantage, and difficulty, is deciding what to omit from standard courses to make room for addition of STS content.

2. Extension of an Existing Unit of Study. This approach calls for adding STS content and activities to the end of a lesson or set of lessons on traditional content in the social studies. For example, a civics unit on interest groups might include a case study of interest group activity about an environmental issue that involves STS content. Students might be required to make and defend civic decisions in response to this STS issue that is appended to standard course content. The main advantage of this approach is maximum flexibility in deciding how much and when to variously treat STS content. A main disadvantage is the likelihood of superficial and unsystematic treatment of STS content.

3. Creation of a Separate Course of Study. A few schools have developed and implemented separate courses on STS. These courses, which are in most cases electives for high school students, tend to be interdisciplinary or multidisciplinary in content, drawing upon subject matter from history and the various social and natural sciences. Course content usually is organized around current social problems and issues. One advantage of separate STS courses is to give high visibility and legitimacy to this emerging field of study. Another advantage is to provide ample opportunity for systematic and sustained study of the various interrelationships of science/technology/society. A disadvantage is the great complexity of the challenge of organizing course content that is drawn from various academic disciplines.

Proposals for infusion of instruction dealing with science- and technology-related social issues have been met with predictable concerns about an overcrowded curriculum, the shortage of materials, and the need for teacher education to overcome presumed deficiencies in knowledge and skills of classroom instructions. However, over and above these concerns is a general consensus among national leaders in education about the importance of science/technology/society in the general education of citizens for a democratic society.

A new curriculum framework report has been published by the Social Science Education Consortium for educators in the social studies and sciences who are willing to act on their assumptions about the importance of STS in citizenship education. Authored by Faith Hichman, John Patrick, and Rodger Bybee (1987), this publication provides guidelines for development and implementation of education on STS in

secondary schools. The recommendations in this report (developed as part of an STS project funded by the National Science Foundation) provide a foundation for future work by science and social studies educators.

## REFERENCES AND ERIC RESOURCES

Following is a list of resources including references used to prepare this Digest. Those items followed by an ED number are in the ERIC system and are available in microfiche and/or paper copies from the ERIC Document Reproduction Service (EDRS). For information about prices, write EDRS, 3900 Wheeler Avenue, Alexandria, Virginia 22304 or call 1-800-227-3742. Entries followed by an EJ number are annotated monthly in CIJE (CURRENT INDEX TO JOURNALS IN EDUCATION) which is available in most libraries. EJ documents are not available through EDRS; however, they can be located in the journal section of most libraries by using the bibliographic information provided below. Bybee, Rodger W. and Teri Mau, "Science and Technology Related Global Problems: An International Survey of Science

Educators." JOURNAL OF RESEARCH IN SCIENCE TEACHING 23

(July 1986): 599-618. EJ 346 083. Hamlett, Patrick W. "Science, Technology, and Politics: The

Literature." TEACHING POLITICAL SCIENCE 14 (Summer 1982):

158-162. EJ 364 204. Hickman, Faith, John J. Patrick and Rodger W. Bybee.

## SCIENCE/TECHNOLOGY/SOCIETY: A FRAMEWORK FOR CURRICULUM

REFORM IN SECONDARY SCHOOL SCIENCE AND SOCIAL STUDIES. Boulder, CO: Social Science Education Consortium, 1987. ED

288 783. Patrick, John J. and Richard C. Remy. "Crossing Two Cultures in

the Education of Citizens." AMERICAN BIOLOGY TEACHER 44

(September 1982): 346-350. EJ 267 503. Patrick, John J. and Richard C. Remy. CONNECTING, SCIENCE,

## TECHNOLOGY, AND SOCIETY IN THE EDUCATION OF CITIZENS.

Boulder, CO: Social Science Education Consortium, 1985. ED



251 389. Patrick, John J. CONNECTING SCIENCE AND FREE GOVERNMENT IN  
**CITIZENSHIP EDUCATION: TEACHING ABOUT  
OUR LEGACY FROM THE**

AGE OF ENLIGHTENMENT. Paper presented at the conference on  
Science/Technology/Society in the Secondary School

Curriculum at St. Michael's College, Winooski, VT, November

6, 1987. ED 287 794. Science and Society Committee of the National Council for the  
Social Studies. "Guidelines for Teaching Science-Related

Social Issues." SOCIAL EDUCATION 47 (April 1983): 258-261.

EJ 280 085. Solomon, Joan. "Science and Society Studies in the School  
Curriculum." SOCIAL SCIENCE REVIEW 62 (December 1980): 213-219.

EJ 242 877. White, Charles S. THE ROLE OF THE SECONDARY SOCIAL STUDIES  
CURRICULUM IN DEVELOPING TECHNOLOGICAL LITERACY. Paper  
presented at the Second National Science, Technology,

Society Conference, Washington, DC, February 6, 1987. ED

278 610. White, Charles S. DEMOCRATIC CITIZENSHIP AND INFORMATION  
TECHNOLOGY: PROMISES, CHALLENGES, AND REMEDIES. Paper

presented at the 50th Anniversary Conference of the American

Society for Information Science, Boston, MA, October 5,

1987. ED 288 791.

This publication was prepared with funding from the Office of Educational Research and  
Improvement, U.S. Department of Education, under contract no. R188062009. The  
opinions expressed do not necessarily reflect the positions or policies of OERI or

**ED.**

Phillip A. Heath is an associate dean at The Ohio State University, Lima Campus. He is

a member of the Science and Society Committee of the National Council for the Social Studies and has served as chairperson of this NCSS committee.

---

**Title:** Science/Technology/Society in the Social Studies. ERIC Digest.

**Document Type:** Information Analyses---ERIC Information Analysis Products (IAPs) (071); Information Analyses---ERIC Digests (Selected) in Full Text (073);

**Available From:** ERIC Clearinghouse for Social Studies/Social Science Education, 2805 East Tenth Street, Suite 120, Indiana University, Bloomington, IN 47405.

**Descriptors:** Citizenship Education, Civics, Critical Thinking, Curriculum Enrichment, Elementary Secondary Education, Public Affairs Education, Science and Society, Social Studies, Technological Literacy

**Identifiers:** ERIC Digests

###



[\[Return to ERIC Digest Search Page\]](#)