

NEW JERSEY
Statewide Systemic Initiative
NJSSI 

Mathematics and Science
Curriculum Programs
Resource Guide

2002

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NJ SSI Mathematics and Science Curriculum Programs Resource Guide

Second Edition

Introduction

The New Jersey Statewide Systemic Initiative (NJ SSI) is a partnership initiated in 1993 and dedicated since then to strengthening mathematics, science and technology education for all students in New Jersey. Partners in NJ SSI include school districts throughout the state, many institutions of higher education, business and industry, state government, professional groups, and other organizations. In addition, there are six NJ SSI Regional Centers in the state. NJ SSI is based at Rutgers, The State University, and is funded by the National Science Foundation, the State of New Jersey, and other sources. NJ SSI collaborated with Research for Better Schools to develop this publication.

The purpose of this NJ SSI *Mathematics and Science Curriculum Programs Resource Guide* is to provide schools and districts with up-to-date information on excellent research-based instructional programs in K–12 science and mathematics. Many of the programs in the *Guide* were funded by the National Science Foundation, which requires that curriculum materials be field tested with diverse populations of students. Some of the listed programs were developed before national standards were developed and have been retro-fitted to align with the standards. The newer, nationally disseminated programs have been developed to align with those standards. Districts wishing to select and implement one or more of these science or mathematics programs should analyze them carefully against the New Jersey Core Curriculum Content Standards, focusing on the NJ Cumulative Progress Indicators for the grade ranges of students with whom the materials will be used. The *New Jersey Science and Mathematics Curriculum Frameworks* are helpful references in this regard.

The mathematics and science program listings in this second edition of the *Guide* are set up so that descriptive information is provided on each program, along with the grade levels of students for whom the program is intended. Contact names are provided, not only for the commercial publishers of the programs but also, in most cases, for the developers (project or program directors). Some recent programs are still under development and have not yet been acquired by a publisher. We recommend that districts contemplating the adoption of any of the programs contact the developers when possible. They can be of assistance in materials selection and curriculum implementation. Usually they can also recommend a professional development provider knowledgeable about the program. Such professional development services are described under their own new heading in each entry. We also recommend contacting individuals at the Curriculum Implementation Centers under Sources of Implementation Support at the end of this *Guide*. (See pp. 120 to pp. 131.)

Other new headings within entries, where appropriate information is available, as compared with the earlier edition of the *Guide* are: Assessment Materials, Other Language Versions, Evidence of Effectiveness, and Recognitions Received. Hopefully these new headings provide additional information useful to readers who are considering adoption of a program. In addition, several new programs have been added to the *Guide*, along with a new curriculum implementation center—The SCI Center at BSCS that provides support in the area of high school science.

The programs listed in the body of the *Guide* are basal in nature. That is, they are designed to fulfill the requirements of a comprehensive full-year or multi-year instructional program in mathematics or science. The listings are not meant to be complete. There are other basal, commercially available programs in mathematics and science that meet the standards in varying degrees. There are also several excellent supplemental programs that focus on a particular topic or topics. These programs can be used to supplement basal programs in order to strengthen or “fill in the gaps” to better align with the Standards. A few of these supplemental programs that were developed with National Science Foundation funding appear beginning on page 107. Most were developed in New Jersey, all are excellent, and all provide locally available, supportive professional development.

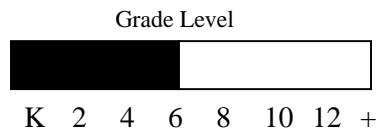
For those who have Internet access, this *Guide* is also available in electronic form under “Resources” on our NJ SSI web site:

<http://njssi.rutgers.edu>

We hope you find both the online and print versions of the *Guide* helpful in learning about and implementing these instructional programs in the classroom.

Mathematics Programs

Everyday Mathematics



Everyday Mathematics is a K–6 curriculum intended to enrich the mathematical experiences of teachers and children. It builds on fundamental mathematical strands such as numeration and order, measures and measurement, reference frames, operations, patterns, functions, and sequences. It covers a wide spectrum by exploring data and chance, geometry and spatial sense, and algebra and the uses of variables.

Each grade level in the program comprises 10 to 12 units, each of which is divided into 10 to 12 lessons. Highlights of this enriched curriculum include:

- linking mathematics to everyday situations wherever possible
- linking past experiences to new concepts and providing for ongoing review
- providing considerable opportunity for cooperative learning through partner and small-group activities
- developing concept readiness through hands-on activities and explorations
- increasing "fact-power" by using basic number facts in many concept-oriented activities and by practicing through games
- solving problems in more than one way and sharing and discussing different strategies.
- providing for a variety of assessment opportunities
- enhancing home-school partnerships.

Certain lessons in grades K–3 are Explorations, which provide children expanded opportunities to work in small groups exploring a concept through the use of hands-on materials. In all grades students have projects that are cross-curricular in nature and include observing, communicating, identifying, reading for mathematical content, and collecting, organizing and graphing data. At all grade levels, students play games to reinforce the skills they have learned. These games relieve the tedium of fact practice while developing good fact power. Games can be played over and over without repeating the same problems because the numbers in most games are generated randomly.

In grades 4 and 5, children participate in the year-long World Tour and American Tour projects, in which students apply mathematical concepts to learning about the United States and other countries.

Calculators are an integral part of the program as an aid to concept development and applications. The curriculum assumes that each child has a slate, calculator, measuring tools, and drawing tools, and that each teacher has a classroom set of manipulatives.

Program Components

Every student in grades 1–6 uses two consumable journals throughout the school year to record mathematical ideas and responses to activities and problems. Starting in grade 3, each student has a hardcover Reference Book, which works with the journals. Grades 4–6 use the Geometry Template for drawing and measuring geometric figures. Each grade level of *Everyday Mathematics* has a Teacher Resource Package that contains a Teacher's Manual and Lesson Guide, Resource Book (with all blackline masters), Teacher's Reference Manual, Towards a Balanced Assessment, and other teacher support items.

Other Language Versions

Spanish student materials are available.

Professional Development Services Available

The University of Chicago School Mathematics Project Everyday Mathematics Center and the publisher provide professional development opportunities to all users of the curriculum. These include new user and experienced user conferences, leadership institutes, and on-site customized training. Staff development support kits and videotapes are also available.

Evidence of Effectiveness

Published studies include *Student Achievement Studies, Vol. 3*, with reports on student achievement from around the country, as well as *The Research Basis for Everyday Mathematics*. A third publication, *Success Stories*, describes positive changes taking place at schools that have implemented *Everyday Mathematics*. Additional data on implementation and achievement are available from the University of Chicago School Mathematics Project (see below).

Recognitions Received

Everyday Mathematics has been designated a *promising* mathematics program by the U.S. Department of Education.

Implementation Costs

Contact the publisher for current pricing; recent prices for the second edition include the Teacher Resource Package: \$190; and a Student Materials Set: \$25.

Contacts and Web Sites

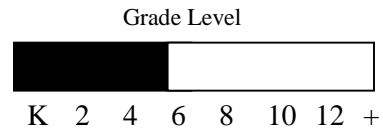
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Math Trailblazers



*Math Trailblazers*TM: *A Mathematical Journey Using Science and Language Arts* is a K-5 mathematics curriculum for schools that want their mathematics programs to reflect the goals and ideas of the National Council of Teachers of Mathematics (NCTM) Standards. *Math Trailblazers* is based on the belief that mathematics is best learned in real-world contexts that make sense to children; that all students deserve a richer and more challenging curriculum; and that a balanced and practical approach to mathematics learning is what students need and what teachers want. The curriculum introduces challenging content at every grade level, including computation, measurement, data collection, statistics, geometry, ratios, probability, graphing, simple algebra, estimation, mental arithmetic, and patterns and relationships. Every grade level has 16 to 20 units; units range from one to three weeks long.

The units are integrated, even in the early grades. The science content in *Math Trailblazers* focuses on a small set of simple variables that are fundamental to both mathematics and science: length, area, volume, mass, and time. Understanding these basic variables is an essential step to achieving scientific understanding of more complex concepts. Measurement is presented in meaningful, experimental situations. Emphasizing the scientific method and fundamental science concepts helps students develop an understanding of how scientists and mathematicians think.

Math Trailblazers also makes a strong connection to language arts. As part of every lesson, students discuss and write about mathematics. Many lessons use trade books to launch or extend mathematical investigations. The curriculum contains original stories, called Adventure Books, which show applications of concepts being studied or episodes from the history of mathematics and science.

Program Components

Components of the *Math Trailblazers* curriculum vary across grade levels. For grades 1 and 2, student materials are consumable and consist of a Student Guide, a Discovery Assignment Book (which contains student activity and homework pages) and an Adventure Book. For grades 3–5, Student Guides are hardcover, non-consumable texts, and Adventure Books are spiral-bound, non-consumable texts; the Discovery Assignment Book for grades 3–5 is consumable. Kindergarten student materials are reproducible pages contained in the teacher materials. *Math Trailblazers* requires the use of manipulatives. Calculator use is integrated into the program and required for some activities.

For every grade level, *Math Trailblazers* includes a Teacher Implementation Guide that provides background information and support for teachers on the pedagogy and content. The Teacher Implementation Guide includes a series of 13 documents called TIMS Tutors. The tutors provide information on a wide variety of topics in pedagogy, mathematics, and science. The tutors also serve as a source of background information for teachers. Teacher materials for grades 1–5 consist of Unit Resource Guide Files, which contain teacher support materials organized for each unit of the curriculum. Teacher materials for kindergarten also include a Teacher Resource Book.

Assessment Materials

Math Trailblazers includes a comprehensive program of both formal and informal assessment of student learning. The philosophy and components of the assessment program are described in the Teacher Implementation Guide, with specific suggestions for implementation. Assessment Materials from the curriculum illustrate key ideas. Many assessment activities are incorporated into daily lessons; others are included in formal assessment units. Assessments include a mix of short, medium-length, and extended activities. Beginning in third grade, *Math Trailblazers* provides a scoring rubric for assessing students' work and tools for students to assess their own work.

Other Language Versions

Spanish editions of all student materials are available at all grade levels. A Letter Home in Spanish is available for grades 1-5.

Professional Development Services Available

A one-week introductory workshop for teachers and schools that are using *Math Trailblazers* is available through Kendall/Hunt Publishing Company. Initial implementation of the curriculum is supported by an additional staff development program that supplements the Kendall/Hunt workshops. This staff development should extend at least through the first year of implementation. For specific suggestions about designing local staff development efforts related to *Math Trailblazers*, contact the Teaching Integrated Mathematics and Science (TIMS[®]) Project (see below).

Evidence of Effectiveness

Both the TIMS Project and Kendall/Hunt Publishing can provide studies of the impact of *Math Trailblazers* on student achievement.

Implementation Costs

Grade 5 Teacher Materials include Unit Resource Guide File: \$349.99; Examination Package: \$179.99; Transparency Package: \$89.99; and Laminated Wall Chart: \$29.99. Grade 5 Student Materials include the hardbound Student Guide: \$36.99; softbound Discovery Assignment Book: \$7.99; wire coil Adventure Book: \$15.99; and class Manipulatives Kit: \$97.99. Contact the publisher for pricing on other components.

Contacts and Web Sites

Developer

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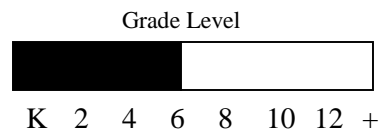
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MathLand



MathLand is a comprehensive mathematics program for grades K–6 focused on students' use of problem-solving approaches to investigate and understand mathematical content. The instructional design provides student involvement through open-ended activities for which the teacher becomes the coach, prompting student discussions. *MathLand* uses students' everyday life as the context for activities, beginning with students' everyday language and connecting it to mathematical language and symbols.

The program is based on a 36-week school year and is divided into 10 units at each grade level, with the exception of kindergarten, which has eight units. *MathLand* presents students with coherent, connected, and accessible mathematical experiences. The foremost learning goal for *MathLand* is that students become mathematically proficient and confident problem-solvers. Each unit of the program includes investigations, problems, and exercises that are interrelated. The materials emphasize development of skills such as problem solving, communication, reasoning, mathematical connections, estimation, measurement, statistics, probability, fractions, and decimals. Progressing through the years, students develop basic skills, advanced conceptual understanding, and problem-solving skills through the use of *MathLand* materials.

MathLand is based on the NCTM standards. The program's goals are challenging, clear, and appropriate for the intended student population. The program was designed to involve students in hands-on investigations to foster problem solving, mathematical communication, connections between disciplines and the real world, and reasoning skills. Concepts are studied in depth, allowing for skill development through exploration and activities, discussion, collaborative work, the use of hands-on materials, technology, graphical and pictorial displays, dramatizations, and oral and written presentations.

Program Components

Student materials include a Student Resource Book, Skill Power, and ArithmeTwists.

Teacher materials consist of the *MathLand* Guidebook, Daily Tune-ups (10-minute activities), Resource Manager, Assessment Guide, Smart Strands (week-long investigations), and Teacher's Editions of Skill Power and ArithmeTwists. Also available are classroom manipulative kits, consumable kits, overhead manipulative kits, classroom TI-108 calculators, the Bridges to Home newsletter for parents, and ongoing professional development.

Assessment Materials

Observation, portfolios, pre- and post-tests, daily check-ups, and journal-writing portray student progress. Scoring rubrics based on the curriculum help to determine the degree of student understanding and enable the teacher to give feedback to students and parents in a meaningful way.

Other Language Versions

Teacher components available in Spanish are a Complement to the Guidebook, Resource Manager, Daily Tune-ups, Skill Power, Skill Power Reproducible, ArithmeTwists, ArithmeTwists Reproducible, and

Bridges to Home. Student components in Spanish are Skill Power (set A and B), ArithmeTwists (set A and B), and the Student Resource Book.

Professional Development Services Available

When a school or district adopts *MathLand*, a professional development program will be designed to meet its needs. Staff development is provided by classroom teachers who have in-depth experience with *MathLand*.

Evidence of Effectiveness

The combined results from several studies reveal positive trends in student achievement in a variety of educational settings with multiple student populations. Students using *MathLand* scored higher on mathematics by a statistically significant degree than norm groups in the San Francisco Unified School District and six Los Angeles Unified School District schools. Consistently positive results were also found in 1996–1997 using the Terra Nova Multiple Assessment in eight districts participating in *MathLand's* Assessment Consortium and using district-administered standardized tests.

Recognitions Received

MathLand has been designated a *promising* mathematics program by the U.S. Department of Education.

Implementation Costs

Student materials include Skill Power: \$6.95 per student per year; ArithmeTwists (as an enhancement): \$5.95 per book. Teachers' print materials and classroom manipulative kits are purchased only once, during the initial year of implementation. These materials cost approximately \$1,250 per class and include Teacher's Guides and consumable, non-consumable, and overhead manipulatives.

Contacts and Web Sites

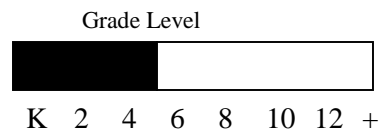
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Investigations in Number, Data, and Space



*Investigations in Number, Data, and Space*TM is a K–5 curriculum. It is designed to invite all students—girls and boys; students from diverse cultural, ethnic and language groups; and students with varying strengths and interests—into mathematics. Encompassing key mathematical ideas at each grade level, the curriculum can be implemented as a whole or used as replacement units. The curriculum offers students meaningful mathematical problems; emphasizes depth in mathematical thinking rather than superficial exposure to a series of fragmented topics; and communicates mathematics content and pedagogy to teachers. The content emphasizes number relations and operations, two- and three-dimensional geometry, data, and the mathematics of change. All students are expected to explore problems in depth, to use a variety of concrete materials as a natural part of their mathematical work, and to invent their own strategies and approaches, rather than rely on memorized procedures.

Program Components

Investigations is presented through a series of teacher books, one per unit of study at each grade level. Each unit of study consists of investigations that involve students in the exploration of major mathematical ideas. Teacher materials are divided into Curriculum Units for each grade level and Implementation Guides for grade levels K–2 and 3–5. The Teacher Resource Package contains manipulatives, overhead transparencies, and blackline masters.

Student materials include Activity Booklets and Investigations at Home booklets for each unit, and the Student Materials Kit.

Other Language Versions

The Student Activity Sheets are available in Spanish. Family Letters that explain the mathematics of each unit are available in Spanish, Vietnamese, Cantonese, Hmong, and Cambodian.

Evidence of Effectiveness

The report “The *Investigations* Curriculum and Children's Understanding of Whole Number Operations” (Jan Mokros, TERC, January 2000), available at <http://www.lab.brown.edu/investigations>, synthesizes the findings of four studies with the following five conclusions: 1) *Investigations* students do as well on mastery of basic facts as students using other curricula; 2) *Investigations* students do as well or better than students using other curricula in calculation problems; 3) *Investigations* students achieve greater accuracy than students using other curricula on word problems and on more complex calculations; 4) *Investigations* students are less likely than other students to use standard algorithms, and more likely to use their own strategies and algorithms to achieve accuracy; 5) Implementation of the *Investigations* curriculum has the greatest impact when students are encouraged to develop their own strategies and when teachers do not combine *Investigations* with a more traditional approach to teaching algorithms.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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<http://www.terc.edu/investigations>

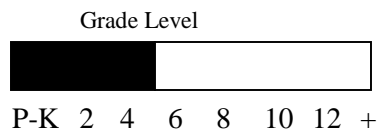
Publisher

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<http://www.scottforesman.com>

Other Web Site

<http://www.lab.brown.edu/investigations>

Growing with Mathematics



Growing With Mathematics is an activity-based, integrated, and problem-solving approach to learning mathematics for students in grades PreK–5. The program incorporates computation and skill development as a major component, maintaining a balance between concepts and skills. Through hands-on activities, and with teacher guidance, students explore and construct their own knowledge. *Growing With Mathematics* emphasizes content that encourages thinking, problem solving, and in-depth development of concepts. Computation and practice of skills are included so that students develop a strong basis of understanding. The lessons make connections among the different areas of mathematics, other curriculum areas, and the real world. A major focus of the program is number sense, which is an integral part of all lessons on numbers and operations. At the beginning of each lesson, a separate number sense strand provides connected activities to build number sense from lesson to lesson. The program provides the tools that create the context for both oral and written communication to help build understanding of mathematics concepts.

The program's general and content-specific learning goals are clearly outlined at the beginning of the Teacher's Resource and Activity File and throughout the 24 topics. With a clear emphasis on and balance among problem solving, content knowledge, and skill outcomes, the goals are consistent with national standards and reflect current research. Content is aligned with the learning goals, and the sequencing of content at each grade level provides exposures in different contexts allowing students to extend their knowledge. U.S. Department of Education reviewers (see Recognitions Received below) noted the importance of the program's comprehensiveness, length of time spent on student investigations, and emphasis on teacher understanding of both the content of the program and the alignment of student assessment with the program's learning goals.

The instructional design and materials send a consistent message that mathematics is an integral part of the students' environment and experience. Opportunities for collaboration, discussion, and reflection are provided. The program engages students and asks them to apply learned skills in many situations using multiple methods and tools.

Program Components

Teacher materials include the Teacher's Resource and Activity File, Discussion Book (Giant), Math Chat, Math Literature Books, Real World Math (grades 4 and 5), Manipulative Kit, and Teacher Toolkit. For PreK, teacher materials include Mix and Match Number Book, Song Kit, and Jumbo Pocket Dice.

Student materials are the Discussion Book, Student Book, Math Literature Books, and the Student Toolkit.

Assessment Materials

The program has a comprehensive and ongoing assessment system. The assessment system uses multiple approaches, offers formal and informal assessments, and provides information and suggestions about student portfolios.

Professional Development Services Available

Wright Group/McGraw-Hill offers complete inservice training to districts adopting the program. Teachers receive a full day of initial inservice with follow-up days as needed.

Recognitions Received

In 2000, the U.S. Department of Education and the Expert Panel on Mathematics and Science recognized *Growing with Mathematics* as a *promising* mathematics program.

Implementation Costs

A complete Grade Level Set of materials costs under \$1,000 per grade level (Grade 3 costs \$1,136). The program provides options for districts unable to purchase the entire range of materials.

Contacts and Web Sites

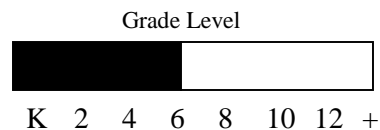
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<http://www.creativepublications.com>

Number Power



Number Power: A Cooperative Approach to Mathematics and Social Development is a supplemental mathematics program for grades K–6 that focuses on developing number sense and social interaction skills in cooperative settings. It is designed to work as a support for number concepts and operations sections of mathematics series used in the classroom.

In grades K, 1, 4, 5, and 6, the curriculum consists of approximately 30 multi-day lessons organized into three units. In grades 2 and 3, the curriculum consists of approximately 60 multi-day lessons organized into seven units. These units engage students in cooperative group work as they learn to make sense of numbers and their relationships, explore numbers as quantities, make judgments about the reasonableness of numbers and solutions, and build understanding about the effects of operations on numbers.

The complexity of the number sense concepts varies from "describe the relative magnitude of numbers by comparing the sizes of different groups of objects" in kindergarten, to "describe the relative magnitude of fractions, percents, decimals, and ratios" in sixth grade. Students are first introduced to a question or concept, and then they explore the concept in different situations over a period of time. Throughout, students learn to estimate, analyze data, use mental computation, and devise their own computation and problem-solving strategies as well as gain proficiency in accurate and efficient computation. They are also encouraged to make connections to their prior learning.

Program Components

Teacher materials consist of one Teacher Resource Book for each of grades K, 1, 4, 5, and 6, and two Teacher Resource Books for grades 2 and 3. Each Teacher Resource Book offers three replacement units (8 to 12 lessons per unit). The instruction pages of each book describe the design of the lesson and the materials required, and include all necessary blackline masters. These books also provide information on the program's pedagogy and management, and address how to assess students' mathematical thinking and how to plan and modify instruction to optimize student learning. Additional planning time may be needed in the first year to create and organize the materials.

Assessment Materials

The ongoing, informal approach to assessment is designed to guide student learning and inform teacher planning. There are multiple methods, opportunities, and suggestions for ongoing assessment throughout the program. Students are also involved in the assessment process through reflection and self-assessment. Assessment is open-ended and intended to inform student learning and guide teachers' instructional decisions. Teacher questioning strategies and notes about teacher observations are written in detailed form in each lesson.

Professional Development Services Available

Professional development is available at \$1,200 per day plus materials and travel expenses. The length of staff development varies, and it is customized to meet the client's needs, ranging from a one-day workshop to in-depth institutes.

Evidence of Effectiveness

The developer of *Number Power* conducted a 1993–1995 evaluation of the effects of the program on teachers and students in second through fifth grade classrooms. Six elementary schools in the San Francisco Bay area were randomly assigned to each of three conditions: curriculum only, curriculum plus staff development, and comparison. A total of 51 teachers participated in the evaluation; 234 students were interviewed during the first evaluation year and 228 during the second evaluation year.

In contrast to the comparison group, both the curriculum only and the curriculum plus staff development groups had significantly greater growth over time (than the comparison groups) in terms of 1) students' depth of mathematical understanding, 2) students' number sense, and 3) flexibility of approach to problem solving. No statistical differences were found in students' clarity of communication or students' confidence in their mathematical abilities.

Recognitions Received

In 1999, the U.S. Department of Education and the Expert Panel on Mathematics and Science Education designated *Number Power* as a *promising* mathematics program.

Implementation Costs

The Teacher Resource Books cost \$19.95 each, plus shipping and handling. Some common objects, such as beans or magazine pages, may have to be collected, and some materials, such as blackline masters or handouts, may have to be created or reproduced. Most of these items could be reused after the first year.

Contact and Web Site

Developer/Publisher

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<http://www.devstu.org>

Mathematics in Context (MiC)

Grade Level



K 2 4 6 8 10 12 +

Mathematics in Context (MiC) is a comprehensive middle school mathematics curriculum for grades 5–8. Connections are a key feature of the program—connections among topics, connections to other disciplines, and connections between mathematics and meaningful problems in the real world. *Mathematics in Context* emphasizes the dynamic, active nature of mathematics and the way mathematics enable students to make sense of their world.

MiC makes extensive use of realistic contexts. From the context of tiling a floor, for example, flow a wealth of mathematical applications, such as similarity, ratio and proportion, and scaling. Units emphasize the inter-relationships among mathematical domains, such as number, algebra, geometry and statistics. As the project title suggests, the purpose of the units is to connect mathematical content, both across mathematical domains and to the real world. *Mathematics in Context* consists of mathematical tasks and questions designed to stimulate mathematical thinking and to promote discussion among students. Students are expected to explore mathematical relationships; develop and explain their own reasoning and strategies for solving problems; use problem-solving tools appropriately; and listen to, understand, and value each others' strategies.

Program Components

The complete *Mathematics in Context* program contains 40 units, 10 at each grade level. The units are organized into four content strands: number, algebra, geometry, and statistics (which also includes probability). Every *MiC* unit consists of a Teacher Guide and a nonconsumable soft cover student booklet. Each booklet consists of a letter to the student that introduces the mathematical content and problem contexts of the unit. Units contain four to eight sections that include brief descriptions of problem scenarios and related problems for students to solve.

The Teacher Guides contain the solutions to exercises, a list of unit goals and objectives, suggestions about the approach and mathematics involved in the unit. A Teacher Resource and Implementation Guide covers topics such as sequence of units, preparation for substitute teachers, preparing families, assigning homework, and preparing students for standardized achievement tests. Number Tools give students further exposure to number concepts, including fractions, decimals, percents, and number sense. A variety of other print materials have been developed to support teachers implementing *MiC*.

Assessment Materials

The *MiC* Teacher Guides provide many informal assessment opportunities, including summary questions, extension activities, and additional activities to aid students who need more experience working with a specific topic. Formal, end-of-unit assessment activities and projects are provided in the assessment section of each guide. Each assessment activity appears as a left-hand page with corresponding solutions and samples of student work and hints and comments appearing on the right-hand page. The Blackline Masters section of each Teacher Guide includes copies of all end-of-unit assessment activities.

Other Language Versions

Student booklets are available in Spanish.

Professional Development Services Available

Encyclopedia Britannica, Inc. has established the MiC Consulting Group to work directly with school districts implementing the *Mathematics in Context* curriculum. The MiC Consulting Group includes staff members at the University of Wisconsin-Madison, The University of Utrecht in The Netherlands, and experienced *MiC* classroom teachers. The MiC Consulting Group will design a comprehensive implementation plan to address the unique needs of districts adopting the curriculum. Services offered by the consulting group include tailor-made implementation plans, introductory workshops, ongoing staff development, parent package, and Internet/Web support.

Implementation Costs

Student book: \$5.35; Teacher Guide: \$21.55.

Contacts and Web Sites

Developer

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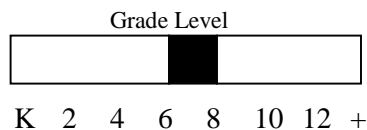
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<http://www.showmecenter.missouri.edu/showme/mic.shtml>

Publisher

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To order: Mathematics in Context/Customer Service, Encyclopedia Britannica, Inc., 310 S. Michigan Avenue, 8th Floor, Chicago, IL 60604
Phone: 800-554-9862; Fax: 312-294-2177

Connected Mathematics



Designed for grades 6–8, *Connected Mathematics* strives to develop student and teacher knowledge of mathematics that is rich in connections and deep in understanding and skill. *Connected Mathematics*'s goals can be summarized into a single standard: all students should be able to reason and communicate proficiently in mathematics. This goal includes knowledge and skill in vocabulary use; forms of representation; materials; tools; techniques; and intellectual methods of the discipline of mathematics, including the ability to define and solve problems with reason, insight, inventiveness, and technical proficiency.

Mathematical concepts are embedded in the context of interesting problems such as real applications, whimsical settings, or mathematical problem situations. As students explore a series of connected problems, they develop skill and deep understanding of mathematical ideas. Problem content becomes a vehicle for understanding and remembering concepts. The curriculum develops six mathematical strands: number, geometry, measurement, probability, statistics, and algebra.

Program Components

Connected Mathematics is organized into units that investigate important mathematical ideas. Each unit contains four to seven investigations; each investigation explores one to five major problems in class to develop students' understanding and reasoning. The problem-centered teaching model consists of three phases: launching the problem, exploring the problem, and summarizing the problem. Extensive problem sets, called Applications, Connections, and Extensions (ACE) help students practice, apply, connect, and extend these understandings. Investigations culminate in Mathematical Reflections, helping students articulate their understandings and connect “big” mathematical ideas and applications.

Students need access to calculators at all times. In grades 7 and 8, students need access to a graphing calculator. Optional computer software programs are suggested to enhance some of the units.

In addition to the Teacher Resource Kit and Teacher Guide Packages, the program manual “Getting to Know *Connected Mathematics*” introduces the program, outlines the content and goals, and provides assistance with mathematics and pedagogy.

Assessment Materials

Connected Mathematics gives students many ways to demonstrate how they make sense of the mathematics in the units. The assessment resources include check-ups, partner quizzes, unit tests, self-assessments, and question blanks. *Connected Mathematics* also suggests using student notebooks and journals as assessment resources. A CD with assessment items is now available.

Other Language Versions

Student Glossary, ACE Problems and Mathematical Reflections, Transparency and Blackline Masters, and Assessment Resources are available in Spanish.

Evidence of Effectiveness

Extensive research and reports on *Connected Mathematics* as it relates to student achievement and teacher professional development are available at the Connected Mathematics Project (CMP) website at <http://www.math.msu.edu/cmp>. There is a substantial and growing body of work showing that CMP is an effective middle school mathematics curriculum, accessible to all students.

Recognitions Received

In 1999, The U.S. Department of Education announced *Connected Mathematics* as one of five curricula to achieve *exemplary* status and the only middle school program identified that year as such. The American Association for the Advancement of Science (AAAS) rates *Connected Mathematics* the highest of 12 middle school mathematics curricula, stating that it "contains both in-depth mathematics content and excellent instructional support."

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

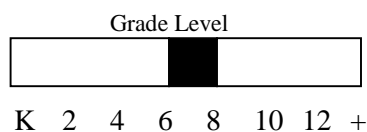
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<http://www.math.msu.edu/cmp>

Publisher

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Phone: 800-435-3499
<http://www.phschool.com/math/cmp/index.html>

Middle Grades Math Thematics



Edited and updated for 2002, *Middle Grades Math Thematics* is a complete three-year mathematics curriculum for students in grades 6–8. This program presents mathematics in relevant and meaningful contexts; each module focuses on a theme that extends throughout the module. The goals of this program are to help all students develop their abilities to reason logically, apply mathematical skills to real-life activities, communicate mathematically, and feel confident in using quantitative and spatial information to make decisions. The materials are designed to integrate communication into mathematics by providing opportunities for students to use reading, writing, and speaking as tools for learning mathematics. Major mathematical strands of the program include number concepts, measurement, probability, statistics, algebra, geometry, and discrete mathematics. Topics such as quantitative literacy and discrete mathematics receive much more emphasis than in a traditional curriculum.

The instructional approach engages students in doing mathematics in a variety of settings. It encourages active learning, and students work both independently and in cooperative groups to investigate mathematics and solve real-life problems. Not all instruction, however, is through discovery learning; the program includes direct instruction in concepts and skills as well. The curriculum offers practice, review, and extension exercises that reinforce and extend learning.

Program Components

Each of the three grade levels of *Math Thematics* includes eight modules; each module requires about four weeks of instruction. The modules are available as a consolidated text for each grade level. Accompanying each grade level is a Teacher’s Resource Package. The package includes 1) an annotated Teacher’s Edition with warm-up activities, closure questions, and answers to all student text exercises and questions; 2) a Professional Development Handbook that outlines program philosophy, assessment, and scoring rubrics; and 3) Teacher’s Resource Books that provide module-by-module teaching strategies, classroom management tips, and blackline masters.

Products available for students are student manipulative kits, personal student tutors, interactive transparencies, a computer test, and a practice generator. *Math Thematics* assumes that students have access to a scientific calculator. Graphing calculators can benefit students in the eighth grade modules, but are not required.

Assessment Materials

Assessment is an integral part of the *Math Thematics* materials. Each grade-level course begins by introducing students to assessment criteria that are used for assessing problem solving and mathematics communication on open-ended problems and projects throughout the modules. Other assessment tools include “checkpoint” questions that check students’ understanding as they explore mathematics; reflection exercises that ask students to describe, summarize, and extend mathematical ideas; module assessments in which students reflect on a module as a whole; and portfolio projects to assess whether students can apply what they have learned.

Other Language Versions

Supplementary materials are available in Spanish

Professional Development Services Available

McDougal Littell runs overview workshops and provides inservice programs led by national consultants and teacher users.

Evidence of Effectiveness

Field test and evaluation results are available from McDougal Littell (see Web site below). The project was known as the STEM Project during its development from 1993–1998. Field tests found STEM students outperforming non-STEM students on 80 percent of learner outcomes. Overall, students in STEM performed significantly better than did non-users in the following general areas: problem solving; fractions; decimals and percents; statistical concepts and applications; and probability.

An independent evaluation found that all end-of-year success ratings, except those for technology, were above the target level of 75 percent. Researchers at the University of Iowa credited the STEM Project as an important factor at one rural school that doubled its achievement scores on the “Ability to Do Quantitative Thinking” test within four years.

Implementation Costs

Per year costs are as follows: Pupil’s Edition: \$44.22; Teacher’s Edition: \$76.26; Teacher’s Edition Package: \$235.86; and Student Manipulative Kit: \$620.70.

Contacts and Web Sites

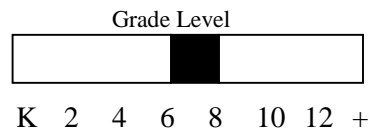
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Publisher

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MathScape: Seeing and Thinking Mathematically



MathScape: Seeing and Thinking Mathematically is a comprehensive, three-year middle school mathematics curriculum that focuses on mathematics in the human experience. Throughout the 21 units of this curriculum, students experience mathematics as fundamental to human endeavors throughout the world and history—endeavors such as planning, predicting, designing, creating, exploring, explaining, coordinating, comparing, and deciding.

The curriculum focuses on four mathematical strands that develop across the three grade levels: Numbers; Algebra; Geometry and Measurement; and Data Analysis and Probability. The program supports students in learning mathematics by having students *do* mathematics, use and connect mathematical ideas, and actively construct their own understandings.

There are seven *MathScape* units at each grade level. The units explore mathematical topics in depth, such as “what is a function?” or “how do you interpret information on Cartesian graphs?” The curriculum engages students in hands-on investigations that involve mathematical concepts, skills, and processes, and it provides opportunities for practice and application of basic skills.

The lessons in *MathScape* prompt students to work collaboratively in pairs and in groups to communicate about mathematics, to write in mathematical terms and to reflect on their thinking and learning. Communication is a key element in *MathScape*.

Program Components

Student Guides for each unit in grades 6, 7, and 8 are available in consolidated (hardcover) or modular format. Another resource for students is Hot Words, Hot Topics: Math User’s Handbooks for grades 6, 7, and 8.

Calculators are used throughout the curriculum. Each unit identifies Technology Options, appropriate junctures for the use of spreadsheets and other optional computer software programs. Suggestions for using graphing calculators are provided throughout the eighth grade units.

Teacher’s Guides for each unit are available in modular format. Each guide also provides Math Background pages where teachers can find information about the mathematics of the unit. Hot Words, Hot Topics Teacher’s Guides, Manipulative Kits, Unit Preparation Chart, and Reproducible Skill Quizzes and answers for each module are other teacher resources.

Assessment Materials

Each unit features an assessment package with options that allow teachers to choose when and how to assess students. Resources include embedded assessment tasks with detailed rubrics and sample student work; skill quizzes; final projects; pre-assessment tasks; and suggestions for using portfolios.

Professional Development Services Available

For information on professional development services, contact Ann Lewis, Glencoe/McGraw-Hill, Phone: 866-421-7871 (toll free).

Evidence of Effectiveness

Contact the publisher for copies of *Stories from Creative Classrooms: A San Mateo-Foster City, CA Study*, and *A Vallejo, CA Study*.

Recognitions Received

MathScape is one of the four top-rated programs in the AAAS/Project 2061 evaluation of middle school mathematics programs.

Implementation Costs

Materials include Teacher Guide for each unit: \$25.98; hard-cover student book (entire grade level of 7 units): \$36.99; soft-cover student book (for one unit): \$8.49; optional Hot Words, Hot Topics handbook (Teacher's Edition): \$24.99; optional Hot Words, Hot Topics handbook (Student's Edition): \$18.99; optional manipulative kit: price varies by grade level

Contacts and Web Sites

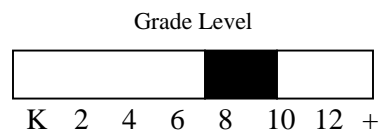
Developer

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I CAN Learn



I CAN Learn[®] is a computerized algebra curriculum program designed primarily to help ethnically diverse, inner-city students in grades 7–10 achieve equity in higher-level mathematics and thinking skills. Student proficiency in problem solving is a primary goal. The interactive full multimedia curriculum enables each student to learn at his or her own pace. Master teachers instruct each child through the digitally-based MPEG video. The MPEG video is a full-screen television-quality video that is integral to every *I CAN Learn* lesson. This technology delivers high-quality curriculum content, addressing a diversity of learning styles and providing equity in education for every student. The program’s learning goals challenge educators to encourage minorities and girls to value mathematics; and to promote good reasoning, problem solving, and communication.

I CAN Learn guides students through a complete algebra curriculum that conforms to the NCTM content standards and state curriculum frameworks. Following the five-part Direct Instruction method popularized by Madeline Hunter, the program presents students with mathematical problems and current real-world problems. Multiple solution strategies, such as symbol manipulation graphing and graphing calculators, allow for different approaches to the same problem and diversity in learning styles and abilities. Built-in electronic discussions encourage communication between students, peer tutoring, and collaboration in cooperative learning groups. The design also provides individualized instruction that permits students to review the material and lessons as often as necessary. A variety of assessments integral to instruction are offered. Self-assessments and discussions provide students with opportunities to reflect on learning.

The user-friendly program allows students and teachers to gain confidence with technology. With the verbal and visual instructions, students and teachers can begin using *I CAN Learn* algebra within a few minutes. A continuous assessment feature provides a user-friendly method for teachers to monitor student proficiency in real-time.

Program Components

Teacher materials include 131 lesson objectives matched with the NCTM standards, periodic quizzes, and cumulative reviews.

Assessment Materials

Assessment is continuous and embedded throughout the *I CAN Learn* program. Pre-tests introduce upcoming lessons. Guided practice offers challenging practice problems with instant feedback. Quizzes and cumulative reviews inform teachers of student understanding. Eighteen real world projects are embedded throughout the objectives and incorporate material learned in previous lessons into challenging and stimulating life situations. Eighteen comprehensive tests are given to students for authentic assessment. The tests contain a variety of problem styles that conform to national standardized tests, including the Iowa Test of Basic Math Skills.

Professional Development Services Available

Computer technicians from JRL Enterprises, Inc. install the *I CAN Learn* program with its necessary hardware and custom desks. The technicians remain to assure that teachers and students are comfortable with the system, and spend one to two days training the teacher. The program contains computer-generated voice instructions and intuitive menus guide students and teachers.

Evidence of Effectiveness

Two independent evaluations conducted in 1995 and 1996 demonstrated statistically significant gains in pre- and post-test scores for *I CAN Learn* students. The 1995 evaluation of 192 ninth graders showed that *I CAN Learn* students performed better than control students by a statistically significant margin. In addition, student retention of material appeared to be greater with the *I CAN Learn* computer-assisted instruction. Benefits of computer-assisted instruction were evident for males and females, all ability groups, and all teachers.

A follow-up evaluation conducted in April 1996 concluded that the *I CAN Learn* students learned faster and retained more material than the control group. This evaluation showed that the *I CAN Learn* software enhanced Algebra I achievement by a statistically significant margin. Students using *I CAN Learn* progressed at their own pace; for many students, this pace was more accelerated than the control group.

Gains in students' understanding of mathematics were demonstrated through improvements in CAT scores for *I CAN Learn* students in eighth grade at two middle schools. Evidence also showed that *I CAN Learn* enabled inner-city students in grades 8–10 with strong at-risk academic profiles to enroll in Stanford University's Education Program for Gifted Youth Program.

Recognitions Received

In 2000, the U.S. Department of Education and the Expert Panel on Mathematics and Science Education identified *I CAN Learn* as a *promising* mathematics program.

Implementation Costs

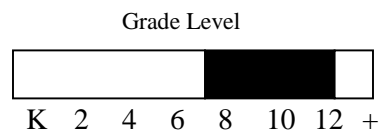
The cost for a 30-student *I CAN Learn* Computerized Algebra system is about \$100,000, plus computers, custom desks, installation, and support. Turnkey classrooms are also available.

Contact and Web Site

Developer/Publisher

Sarah Shaw, I CAN Learn Education Systems, JRL Enterprises, Inc., 3520 Gen. DeGaulle Drive, Suite 1100, New Orleans, LA 70114
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<http://www.icanlearn.com>

University of Chicago School Mathematics Project (UCSMP)



*The University of Chicago School Mathematics Project (UCSMP) secondary level materials constitute a six-course mathematics curriculum, each lasting a full year, for students in grades 7–12. Average to above-average students can begin this curriculum in sixth grade. The six courses offered are *Transition Mathematics*; *Algebra*; *Geometry*; *Advanced Algebra*; *Functions, Statistics, and Trigonometry*; and *Precalculus and Discrete Mathematics*. Each course is intended to stand alone, but it is preferable to use them in sequence. All *UCSMP* courses place continual emphasis on applications to the real world and to solving problems. *UCSMP* is designed to revitalize the traditional mathematics curriculum, improve student achievement, and increase the number of students who take mathematics beyond algebra and geometry.*

The program presents mathematical concepts by looking at patterns, proofs, problems, and examples in order to develop understanding in students and present mathematics in both inductive and deductive ways. The program challenges students to move from specific examples, to conjectures, to generalizations; it offers continuous review along the way. To encourage higher order thinking, the program asks students to communicate their reasoning clearly. Every chapter makes connections with other disciplines and across the mathematical strands. Long-term investigations help students to form a solid and deep understanding of mathematical concepts. The range of exercises are challenging and inviting to students, including lower level students, students with language barriers, and accelerated students.

Program Components

Each *UCSMP* course uses student textbooks and Teacher's Editions. The Teacher's Edition at each level provides the background, teaching suggestions and resources that teachers need on a daily basis to implement the program. A Teacher's Resource File also provides support for teachers implementing the program. Support materials include: Lesson Masters, Teaching Aid Masters, Assessment Sourcebook, Technology Sourcebook, Answer Masters, Solution Manual, and a User's Handbook for implementing *UCSMP*. Also available are Visual Aids, Activity Kit, Teacher's Resource File CD-ROM, calculators, Study Skills Handbook, Geometry Template, Wide World of Mathematics Videotape/Videodisc/CD-ROM, Technology Sourcebook DataPak, Quiz and Test Writer Software, and other support material.

Assessment Materials

UCSMP includes a detailed, thorough, and carefully designed program of assessment. Teachers gain ongoing knowledge of student mastery of material from group activities and student assignments. The program recognizes the need for varied assessment devices so that students, regardless of learning style or ability, have ample opportunity to demonstrate the levels of learning they have attained. Students are also able to assess their own strengths and weaknesses as they complete assignments. Both formal and informal methods of assessment are provided daily, and most follow the same format as the individual lessons and warm-ups. The alternate test forms, chapter projects, and activities offer other types of

assessment. Information is supplied to teachers on how to select assessment tools from the wide variety, how to score them, and how to evaluate them. Technology assessments are both within the lessons and included as separate activities.

Professional Development Services Available

UCSMP and the publisher offer annual conferences at the University of Chicago and other regional meetings. Trained specialists are available to conduct school and district inservice meetings, and newsletters are distributed to educators on the mailing list. Continuing education units are given for recertification.

Evidence of Effectiveness

Three evaluation studies in the 1980s showed evidence of gains in student understanding of mathematics. More recent studies confirm the positive effects on mathematics problem solving and applications. A 1992–1993 study indicated that, overall, students using *UCSMP*'s second edition of *Transition Mathematics* scored higher, to a statistically significant degree, than non-*UCSMP* students on the project-designed algebra post-test and project-designed geometry post-test. Students using *UCSMP*'s second edition of *Algebra* outperformed non-*UCSMP* students, to a statistically significant degree, on the project-designed algebra post-test and two other project-designed tests of problem solving and understanding.

Recognitions Received

In 1999, the U.S. Department of Education and the Expert Panel on Mathematics and Science Education identified *UCSMP* as a *promising* mathematics program.

Implementation Costs

Contact the publisher for current pricing. For each course, curriculum and support materials can be purchased separately. Schools that purchase classroom sets of the *UCSMP* Student Editions receive the Teacher's Edition and Teacher's Resource File for each teacher at no charge. Optional materials vary by course, and prices depend on the course. Scientific calculators are recommended for all courses. The Explorations CD-ROM (Macintosh/Windows) is recommended for *Functions, Statistics, and Trigonometry*, and *Precalculus and Discrete Mathematics*.

Contacts and Web Sites

Developer

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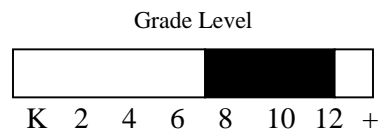
Publisher

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Phone: 800-435-3499

<http://www.phschool.com/atschool/ucsmp>

College Preparatory Mathematics (CPM)



College Preparatory Mathematics (CPM) is a middle grades and secondary mathematics program that integrates basic skills and topics with conceptual understanding and problem-solving strategies to achieve a complete and balanced mathematics curriculum. The courses concentrate on six or seven core ideas that are introduced, practiced, revisited, mastered throughout the year, and reinforced in subsequent courses. The two middle grades courses, Foundations for Algebra: Years 1 and 2, are designed to prepare students for algebra. The focuses of the other courses are as follows: Mathematics 1: writing, solving, graphing equations and symbol manipulation; Mathematics 2: geometric properties, spatial visualization, and conjecture and explanation; Mathematics 3: representation and modeling, intersections and systems, algorithms, and reasoning and communication; Mathematics 4: concepts of calculus, analysis of models, trigonometry, and advanced functions. Mathematics 5 is an advanced placement calculus course that covers both AB and BC topics. The curriculum parallels traditional college preparatory course content (Algebra I, Geometry, Algebra II, and Mathematical Analysis/Pre-Calculus).

The program strategies emphasize active learning and group work; students are introduced to problem solving, communication, and reasoning through laboratory experiments and real-world applications. Support materials in the student texts help students review and evaluate their own progress. The problems engage students in applied learning, involve them in individual and collaborative work, and address a variety of learning styles. Students learn concepts through guided instruction, individual and team work, tactile and kinesthetic activities, data collection, class work, and homework. *CPM* encourages students to develop a positive attitude, to become more aware of their own thinking about problems, and to describe their efforts both orally and in writing.

Program Components

Each course includes a Teacher's Edition and student texts. The Teacher's Edition includes recommendations on how to teach each unit, resource pages, collections of test questions, suggestions for alternative assessments, a comprehensive Parent Guide, and information on community communication.

Assessment Materials

An assessment handbook in the Teacher's Edition outlines a variety of options for integrating assessment into instruction, including investigations, portfolios, projects, presentations, problem solving, and daily performance assessment. The wide variety of approaches presented in the teachers' program materials include methods for assessing depth, flexibility, and application of learning.

Other Language Versions

Student Editions of Foundations for Algebra, Mathematics 1, and Mathematics 2 are available in Spanish.

Professional Development Services Available

Teachers using the materials for the first time are expected to attend three to five days of introductory summer workshops and five all-day workshops during the school year. Workshops offered by the

developers of *CPM* are held in more than 15 locations throughout California and at several sites in the U.S. The workshops include introductions to the *CPM* methodologies and course content, alternative assessment, cooperative learning, questioning strategies, and classroom management skills. A free bi-monthly newsletter and a Web site also provide teacher support.

Evidence of Effectiveness

Greater numbers of *CPM* students are pursuing additional college preparatory mathematics courses than their non-*CPM* counterparts have in the years before. *CPM* students score as well as or better than non-*CPM* students on standardized tests that measure mostly isolated skills. California SAT9 mathematics scores in *CPM* schools for grades 9–11 are significantly higher (7.5% in 1998, 9% in 1999) than the state average. *CPM* students score much better on assessments that require creative application of problem-solving strategies and mathematical skills and concepts.

Nine separate studies examined the achievement of approximately 30,000 California students in diverse settings. In three studies that asked students to provide written responses to open-ended questions, evidence consistently favored *CPM* students. The 1992 and 1993 studies indicated that *CPM* students outscored their non-*CPM* counterparts to a statistically significant degree on the algebra and geometry examinations. The 1994 study found that *CPM* students outscored non-*CPM* students to a statistically significant degree on the algebra examination at one of the two test sites. Several studies demonstrated that *CPM* works equally well for both genders, students of various ethnic groups, and students at different places on the performance spectrum.

Recognitions Received

In 1999, the U.S. Department of Education and the Expert Panel on Mathematics and Science Education designated College Preparatory Mathematics as an *exemplary* mathematics program.

Implementation Costs

The workshop series ranges between \$375 to \$750 per teacher, depending on the level of service and the location, plus the cost of up to five days' released time. The student textbook costs approximately \$25 for a two-volume softbound set. Algebra 1 and Geometry hardbound editions are \$38; Foundations hardbound editions are \$42. Teacher's Editions cost \$50 per course; supplies cost approximately \$100 per year. Scientific calculators are recommended for Foundations and Mathematics 1 and; graphing calculators are recommended for Mathematics 3 and 4.

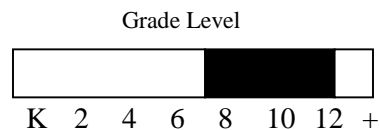
Contacts and Web Sites

Developer/Publisher

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Cognitive Tutor Algebra I



Carnegie Learning® offers *Cognitive Tutor Algebra I*, a full-year, first-year algebra course that integrates technology into its instructional design. It can be used by students in grades 7–12 or by college undergraduates, and it addresses topics in a typical high school or middle school Algebra I course.

An important feature of the program is the use of a new approach to educational software. The intelligent computer tutor is based on nearly 20 years of research in cognitive science and artificial intelligence. It provides each student with an individualized tutor and instant feedback as needed.

Students are constantly investigating and solving real world problems. They work cooperatively on problem-solving activities three days a week in the classroom and individually on computer-based problems two days a week in a computer lab. The *Cognitive Tutor* progressively increases its attention to the entire problem-solving process, so students link numeric, verbal, graphic, and symbolic representations while using tools such as spreadsheets and calculators.

The mathematical content of the *Cognitive Tutor Algebra I* program follows the NCTM standards. For instance, students are often asked to use variables and functions to model mathematical situations. *Cognitive Tutor* also integrates statistics and geometry strands. The program is built around active learning as evidenced by the activity-oriented student text. Many of the problem-solving activities use real-world situations that require students to use written and oral communication and technology. The program provides familiarity and practice with problem-solving methods, algebraic notation, algorithms and geometric representations. Overall, the *Cognitive Tutor Algebra I* focuses on depth rather than breadth of coverage.

Program Components

Included in the program are the full-course curriculum (text, assignments, assessments, and activities), curriculum-integrated software (Cognitive Tutor), a Software Manual for teacher reference, and a full Teacher's Manual.

Assessment Materials

The ongoing, varied approach to assessment in the classroom and computer lab is consistent with the program design and addresses different learning styles. The constant assessment provided by the computer component helps students to assess their own progress, improve areas of weakness, and know their strengths.

Professional Development Services Available

Carnegie Learning's SchoolCare® program includes initial teacher preparation (a 4-day training course for *Cognitive Tutor Algebra I* offered at regional sites); ongoing software updates and upgrades; help-desk telephone and e-mail support; access to exclusive Cognitive Tutor teacher Web site; and reduced rates on printed materials and additional teacher training. Site visits are also periodically conducted.

Evidence of Effectiveness

Cognitive Tutor Algebra has assessed both basic functional skills and higher-order reasoning and problem-solving skills recommended in the NCTM standards. In year-end assessment results between 1993 and 1997 at Pittsburgh and Milwaukee high schools, *Cognitive Tutor Algebra* students scored 50 to 100 percent higher on two project-developed, problem-solving tests than students in traditional Algebra I courses; this percentage was statistically significant. Across three studies, students in the program also scored higher, to a statistically significant degree, on the standardized assessments taken from SAT and Iowa.

In a 1994–1995 study, college students using *Cognitive Tutor Algebra* scored significantly higher than control group students on performance-based assessments focusing on areas such as defining variables, making a table, writing equations, constructing a graph, finding slopes/intercepts, and finding points of intersection. Students using *Cognitive Tutor Algebra* scored at approximately the same level as the control group on final exams targeting algebraic manipulation. Using a survey to collect quantitative data on students' attitudinal change, the Developer found that *Cognitive Tutor Algebra* students had less computer anxiety, to a statistically significant degree, than comparison students.

Recognitions Received

Cognitive Tutor Algebra has been designated an *exemplary* mathematics program by the U.S. Department of Education.

Implementation Costs

A seven-year site license for this curriculum is based upon school size. Quantity discounts are applied for multi-site districts. On-site teacher training can be scheduled at a per diem rate. Additional staff consulting services are provided on a custom basis. The annual cost of SchoolCare, \$2,500 per site, is waived during the first year of the site license.

Contacts and Web Sites

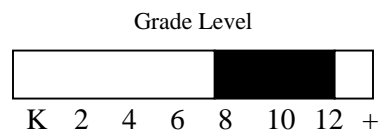
Publisher

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Developer

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<http://www-2.cs.cmu.edu/~pact>

Contemporary Mathematics in Context



Contemporary Mathematics in Context is a four-year integrated mathematical sciences curriculum. It was developed by the Core-Plus Mathematics Project (CPMP), with funding from the National Science Foundation, to prepare students for success in college, in careers, and in daily life in contemporary society. It reflects the content and pedagogy recommended by the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics* and *Professional Standards for Teaching Mathematics*. Independent reviews indicate that the curriculum aligns well with NCTM's *Principals and Standards for School Mathematics*.

The series consists of a sequence of three courses for all students, plus a flexible fourth-year course continuing the preparation of students for college mathematics. The curriculum builds upon the theme of "mathematics as sense-making." Through investigations of real-life contexts, students develop a rich understanding of important mathematics that makes sense to them and which, in turn, enables them to make sense out of new situations and problems. Each course in the *Contemporary Mathematics in Context* series shares the following mathematical and instructional features:

- connected strands of algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics
- mathematical modeling
- access and challenge
- appropriate use of technology
- active learning and teaching
- multi-dimensional assessment.

Program Components

Courses 1 to 4 are now available. Each course is published in two volumes, Part A and Part B to provide flexibility of use. Supplementary Reference and Practice handbooks are available for each of Courses 1 to 3.

A Teacher's Guide for each course contains suggestions for facilitating student investigation and collaborative work, points for discussion, solutions, possible student responses, and useful background information on the mathematical content. In the case of Courses 1 to 3, the Teacher's Guides include full-sized student text pages as facing pages. The Teacher's Guide is complemented by Teaching Resources that contain blackline masters suitable for making transparencies or class handouts to facilitate class discussions, help organize student work, assist with graphing calculator instruction, and provide review and practice of concepts and skills previously learned. An Implementation Guide provides helpful tips and ideas for instruction and assessment and for communicating with parents. In addition, a Scope and Sequence booklet charts mathematical topics in terms of initial development, growth, and connections throughout the four-year curriculum.

For each of Courses 1 to 3, there is a CD-ROM that contains the materials from the Assessment Resources for that course and allows customizing of quizzes and exams or preparation of additional worksheets for review or extra practice. Downloadable software for the TI-82, TI-83, TI-89 and TI-92 calculators extends the capabilities of these tools and supports student investigation of selected topics. A Calculator Software Guide for each course describes the software in more detail.

Assessment Materials

The Assessment Resources provide end-of-lesson quizzes and end-of-unit exams, take-home assessment tasks, and projects as well as a bank of assessment tasks from which a semester or final exam can be constructed.

Professional Development Services Available

Opportunities for professional development include extended implementation workshops, customized on-site workshops, professional development seminars for new users and leadership personnel, users' conferences and a users' e-mail list. One-day sessions for administrators are also available.

Recognitions Received

Based on overall quality and evaluation evidence, *Contemporary Mathematics in Context* was designated an *exemplary* program by the U.S. Department of Education Expert Panel on Mathematics and Science.

Implementation Costs

Student texts for each of Courses 1 to 4 are available in two parts at \$23.50 per part per student. Pricing on teacher support materials described above is available from the publisher.

Contacts and Web Sites

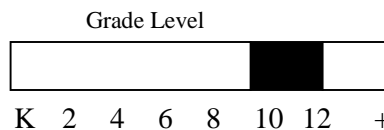
Developer

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Publisher

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<http://www.glencoe.com>

Mathematics: Modeling Our World (MMOW)



Mathematics: Modeling Our World (MMOW), formerly known as *ARISE*, is an integrated core curriculum for high school that is based on the premise that students learn best when they are actively involved in the process. In this program, students do not first learn mathematics and then apply what they have learned. Rather, important questions about the real world come first. Students analyze situations and apply the mathematical concepts needed to solve problems. Contextual questions drive the mathematics. In each unit, students build, test, and present models that describe a real-world situation or problem, such as deciding where to build a fire station. Mathematical modeling is a central focus throughout the curriculum.

Each course covers the mathematical content found in the NCTM Standards. Each of the three grade-level courses of *MMOW* contains seven or eight units. Units are divided into four to seven lessons; each may take several days to complete. Lessons contain a Lesson Opener, which provides the context for the lesson; Activities, which students work on in pairs or small groups, using hands-on mathematical investigation; and Individual Work, items that review, reinforce, extend, practice, and foreshadow concepts developed in the lesson. Course 4 is comprised of eight chapters and is intended to be a bridge between Courses 1 to 3 and collegiate mathematics. The student text contains eight chapters divided into three to six lessons. Each lesson contains an activity designed for group work, expository readings, and exercises. Chapters end with a set of review exercises.

The mathematics in a particular *MMOW* unit may be a mix of geometry, algebra, trigonometry, probability, or precalculus. *MMOW* is a rigorous and integrated program that teaches students traditional concepts as well as newer concepts like discrete mathematics, data analysis and game theory. *MMOW* units are arranged by context and application rather than by mathematical topic. Students are able to integrate what they are learning in mathematics into other content areas, such as language arts, science, social sciences, political science, physical education, and family and consumer sciences.

Program Components

Student materials for *MMOW* are available in hardcover texts, one each for each course. Teachers' materials include, for Courses 1, 2, and 3, an Annotated Teacher's Edition, A Solutions Manual, and Teacher's Resources that includes additional teaching suggestions, background readings, reproducible handouts, assessment problems, supplemental activities, and transparencies. Course 4 contains all the teacher material in the Teacher's Resource Binder. Other materials include a video with segments for each unit and a CD-ROM containing a calculator and computer software written specifically for *MMOW*.

Assessment Materials

In *MMOW*, students' work is assessed on an ongoing basis; assessments are an integral part of the curriculum. Throughout the text, both Activities and Individual Work assignments offer multiple opportunities to evaluate student progress. Classroom participation, reports, demonstrations, and unit

projects allow the teacher to track how well each student understands what he or she is learning. Assessment Problems from the Teacher's Resources provide a more formal review of student work.

Professional Development Services Available

The Consortium for Mathematics and Its Applications (COMAP) provides Web-based and toll-free support for teachers using *MMOW*. Professional development services include training through summer institutes and on-site or regional training activities. Districts that purchase the curriculum arrange with COMAP for training to accommodate their requirements.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

Consortium for Mathematics and Its Applications, Inc., 57 Bedford Street, Suite 210, Lexington, MA 02420

Phone: 800-772-6627; Fax: 781-863-1202; E-mail: info@comap.com

<http://www.comap.com/highschool/projects/mmow/introduction.htm>

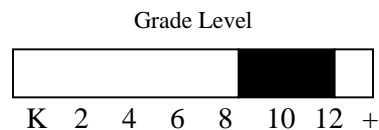
Publisher

Mike Saltzman, Director of Sales, W.H. Freeman & Company, 4B Cedarbrook Drive, Cranbury, NJ 08512

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<http://www.whfreeman.com/highschool>

SIMMS Integrated Mathematics



The *SIMMS Integrated Mathematics* curriculum constitutes a complete redesign of the 9–12 mathematics curriculum using real-world contexts in an integrated and interdisciplinary approach for all students. The curriculum is divided into six levels that include work in such areas as algebra, geometry, trigonometry, analysis, statistics, probability, matrices, and data analysis, as well as less traditional high school topics such as graph theory, game theory, and chaos theory.

All students complete Levels 1 and 2. In the third and fourth years, *SIMMS Integrated Mathematics* offers students and their parents the opportunity to select courses appropriate to individual interests and goals. Levels 1 and 2 concentrate on the knowledge and understanding students need to become mathematically literate citizens. Levels 3 and 4 provide options for students in their third year. While Level 3 may be suitable for students planning careers in mathematics and science, these students should choose Level 4 because it offers a slightly different mixture of context and content. Levels 5 and 6 offer options for students in their fourth year. Level 5 focuses more specifically on applications from business and social sciences. Level 6 materials continue to present mathematics through applied contexts and embrace a broader mathematical perspective.

Each level of *SIMMS Integrated Mathematics* has 13 to 16 modules that include explorations, discussions, and assignments. In explorations, students link the module context to its underlying mathematics and use technology to gain insights into mathematical concepts. Discussions follow each exploration, giving students the opportunity to summarize and share their observations and findings. Assignment problems are set in the context of a specific module and may have students transfer their understandings to other contexts. Mathematics notes furnish students with definitions, symbolism, and appropriate examples. Other features are research projects, summary assessments, and “flashbacks” problems that are designed for additional student practice.

The curriculum was written, revised, and reviewed primarily by secondary teachers of mathematics and science, with review by university professors. It is a complete standards-based mathematics program, designed to replace all secondary mathematics courses, with the possible exception of advanced placement courses. This curriculum takes full advantage of technology and assumes that students have ready access to technology that includes a graphing utility, a spreadsheet, a geometry utility, a statistics program, a symbolic manipulator, and a word processor. Some hand-held graphing calculators now incorporate these features into a single, affordable package.

Program Components

Student materials include *Integrated Mathematics: A Modeling Approach Using Technology*, Levels 1-6, First Edition. Teacher Materials include *Integrated Mathematics: A Modeling Approach Using Technology*, Level 1-6, First Edition; *Level 1 Supplement: Additional Review and Periodic Assessment*; *Level 2 Supplement: Additional Review and Periodic Assessment*; *Empowering Students* (video); and *SIMMS Integrated Mathematics Institute* (professional development instructional video).

Assessment Materials

Assessment materials include Restructuring Mathematics Assessment: Suggestions from the Classroom; Monograph 4: Assessment; Monograph 5: The Classroom; and Assessment Outcomes.

Professional Development Services Available

Professional development is required for implementation of the *SIMSS Integrated Mathematics* curriculum. The facilitators are practicing *SIMSS Integrated Mathematics* teachers who undergo additional training as professional development facilitators. Two weeks of professional development are recommended for all Level 1 and Level 2 teachers prior to teaching the course. Two or three additional sessions of two or three days' duration are recommended during the academic year. For Levels 3 to 6, one week of professional development is sufficient. Each professional development workshop includes work in content, pedagogy, technology, assessment, and implementation strategies in the context of specific modules within the curriculum.

Evidence of Effectiveness

The impact currently collected is described in Monographs 4 and 5 as well as the Assessment Outcomes pamphlet listed above. In broad terms there are two basic conclusions. The first is that students from *SIMMS Integrated Mathematics* classes do at least as well as students from more traditional classes on computation-based mathematics, despite having no access to the technology they regularly used. The second conclusion is that students from *SIMSS Integrated Mathematics* classes do significantly better than students from more traditional classes on open-ended questions that require multiple steps to problem solve. These results have been replicated in other settings as described in Assessment Outcomes.

Implementation Costs

The textbooks cost approximately \$33 per student per year. Teacher's Editions cost \$42 per course. The cost of technology is dependent upon what the district already owns as well as what type of technology it chooses. Professional development institutes are available and generally cost about \$3,500 for a two-week institute plus the travel and per diem cost of the instructors. Follow-up days during the academic year are also recommended.

Contacts and Web Sites

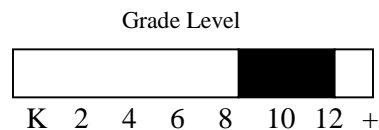
Developer

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Publisher

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Interactive Mathematics Program (IMP)



The *Interactive Mathematics Program* (IMP) is a four-year curriculum of problem-based, integrated mathematics designed to replace the traditional Algebra I, Geometry, Algebra II/Trigonometry, Pre-Calculus sequence. *IMP* integrates traditional mathematics with additional topics recommended by the NCTM Curriculum and Evaluation Standards, such as statistics, probability, discrete mathematics, and matrix algebra. By combining traditional concepts and newer material in an integrated setting, and by placing these ideas in meaningful contexts, the *IMP* curriculum meets the needs of both college-bound students and those headed directly into the workforce.

Most units begin with a central problem that students explore over the course of six to eight weeks. Some of these central problems are based on practical, real-world situations, such as maximizing profits for a business or studying population growth. Others are more fanciful, involving such situations as a pennant race or a circus act. As students work through smaller problems in the unit, they develop the mathematical concepts and techniques they need to solve the central problem. A particular unit may combine several branches of mathematics.

There are three main types of student assignments in *IMP*: in-class activities, daily homework, and Problems of the Week (POWs). Students examine new concepts through in-class activities, working in groups and individually. Homework assignments reinforce and extend concepts introduced in class. POWs are open-ended problems, often mathematical classics that cannot be solved easily in a short period of time. In POW write-ups, students describe how they worked on the problem and explain their reasoning. Each unit also includes a collection of supplemental problems that provide a way to tailor the curriculum to meet the needs of individual students.

Program Components

Student materials for *IMP* are available in one hardcover textbook for each of the four years of the program. Teacher's Guides are available for each of the units in a grade level. Additional teacher support materials for *IMP* are available, including *It's All Write: A Writing Supplement for High School Mathematics* and *Teaching Handbook for the IMP: A Teacher-to-Teacher Guide*.

Assessment Materials

Teachers assess individual students using daily homework assignments, oral presentations, contributions to the group or whole-class discussions, POWs, in-class and take-home unit assignments, end-of-semester examinations, self-assessments, and portfolios.

Other Language Versions

Student texts for years 1 and 2 are available in Spanish and in Hawaiian. Student texts and Teacher Guides for years 1 to 4 are available in French.

Professional Development Services Available

IMP provides support for teachers and districts through teacher workshops, a published curriculum with Teacher Guides for each unit of instruction, and a network of regional centers to assist districts with implementation. The "strategies" book (Introduction and Implementation Strategies for the Interactive Mathematics Program) provides guidance for teacher leaders and administrators on issues such as providing support for teachers and reaching out to parents. The national IMPLementation Center provides overall guidance to schools and districts adopting the program, including an outreach coordinator with a toll-free number, an electronic network, and an annual meeting of teacher-leaders from around the country. Evaluation Updates are also available which summarize ongoing program evaluation efforts.

Evidence of Effectiveness

IMP's research design included a five-year independent evaluation carried out by the Wisconsin Center for Education Research at the University of Wisconsin. Reports are available from the IMPLementation Center (see below). Norman Webb has done several studies comparing the performance of students using the *IMP* curriculum with the performance of students in traditional programs. Dr. Webb has found that *IMP* students do as well as students in traditional programs on standardized tests such as the SAT. This is significant because *IMP* students spend about 25 percent of their time studying topics that are not covered on these tests. To measure *IMP* students' achievement in these other areas, Dr. Webb conducted three separate studies involving students at different grade levels and in different locations. The three tests in these studies involved statistics, quantitative reasoning, and general problem solving. In all three cases, the *IMP* students outperformed their counterparts in traditional programs by a statistically significant margin, even though the two groups began with equivalent scores on eighth grade standardized tests.

Recognitions Received

In 1999, the U.S. Department of Education and the Expert Panel on Mathematics and Science Education designated *IMP* as an *exemplary* mathematics program.

Implementation Costs

Student texts: \$42.95; Teacher Guides: \$20.85 each. Manipulatives and graphing calculators are needed. Teacher training is approximately \$1,000 per year; it varies regionally. Computer programs could provide valuable enrichment for some *IMP* activities, but no activities require computer use.

Contacts and Web Sites

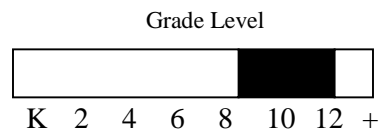
Developer

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Publisher

Key Curriculum Press, 1150 65th Street, Emeryville, CA 94608
Phone: 800-338-7638; Fax: 800-541-02442
<http://www.keypress.com>

MATH *Connections*



MATH Connections: A Secondary Mathematics Core Curriculum was undertaken with a National Science Foundation grant awarded in September 1992. Its overall mission is to develop a core curriculum that opens the concepts of higher mathematics to *all* students and inspires new interest and excitement in mathematics for both students and faculty. Following five years of field testing, and now implementation, independent research indicates that *MATH Connections* provides opportunities for successful student activity at a variety of levels through challenging, open-ended problems as well as reinforcement exercises that accommodate a variety of learning styles and encourage student-teacher and student-student interaction.

MATH Connections has as its guidelines the NCTM Standards for student performance, teacher professional development and alternative student assessments. Each of the three years of *MATH Connections* blends the mathematics of algebra, geometry, trigonometry, statistics, probability and other discrete mathematics. It is concept-driven, built around connections of all kinds that bridge mathematics with the real world of people, business and everyday life. It builds bridges between different mathematical areas, between mathematics and science, and between mathematics and other subjects such as history, geography, language, and art.

MATH Connections focuses on problem solving and reasoning in a way that emphasizes that mathematics is primarily about asking questions and looking for patterns, rather than finding answers and calculating numbers. Each of the three years of the program is built around a general theme that serves as a unifying thread connecting and blending many mathematical topics that traditionally have been taught separately and independently. This approach emphasizes the unity and interconnectedness among mathematical ideas.

Starting with commonplace ideas in real world settings, *MATH Connections* investigates a wide range of sophisticated mathematics topics in a student-friendly way. Technology is integrated into the curriculum through the use of graphing calculators and computers, which students use to investigate concepts, problems, and projects in greater depth and breadth; to make conjectures; and to validate findings. Discussions about how these tools work, why they work, and whether or not they are appropriate for a particular task occur throughout the course. Real world applications and problem situations from the sciences, the humanities, and business and industry are emphasized.

Program Components

The Student Edition is published in six half-year, hardbound textbooks. The Teacher Edition is organized in half-year sections to accommodate different teaching styles and traditional and block scheduling. The Teacher Resource Pack includes the Teacher Edition; a replica of the Student Edition; a Teacher Commentary, which is correlated to the Teacher Edition and provides professional development; Blackline Masters for use as overheads or classroom handouts; and a full set of Form A *MATH Connections* Student Assessments with Solution Keys and Scoring Guides.

Assessment Materials

Student assessment in MATH *Connections* includes written, oral, and demonstration formats that assess higher order thinking skills. In this way, students demonstrate their mathematical skills, their approach to non-routine, real world problems and their understanding of mathematics concepts and how they relate to one another.

Evidence of Effectiveness

For purposes of evaluation, MATH *Connections* students and their non-participating peers were paired for academic ability according to their grade 8 Connecticut Mastery Test. Student achievement on independent standardized mathematics measures from MATH *Connections* field test sites, compiled by independent evaluators, indicates that the MATH *Connections* students outperform their non-participating academic peers on both the Connecticut Academic Performance Test and on the Scholastic Aptitude Test (SAT). Other research results consistently indicate more positive attitudes toward mathematics and more perceptions of the usefulness of mathematics by MATH *Connections* students. In data collected from classroom observations, similar results indicate that MATH *Connections* classes demonstrate “considerable student-student interaction and cognitive discourse levels that evoke a broad range of reasoning, communicating and problem-solving skills.” Further studies have indicated that MATH *Connections* is gender-free, that male and female students are given and take advantage of the same opportunities for involvement, and that male and female students perform equally well on MATH *Connections* quizzes and tests.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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<http://www.mathconnections.com>

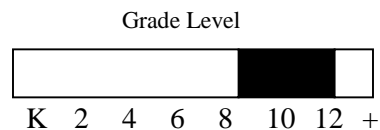
Publisher

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<http://www.its-about-time.com>

Connected Geometry



Connected Geometry is designed to help everyone in the mathematics classroom engage in meaningful mathematical activity by offering students a chance to understand and appreciate the relationships and unifying themes within mathematics, to develop mathematical ways of thinking, and to connect ideas within mathematics. Because high school students and teachers have diverse backgrounds, experiences, and interests, this curriculum provides teachers with a variety of tools (technology, paper cutting and folding, model building) and a variety of topics (art, optimization, design) for exploration of mathematical ideas.

The curriculum encourages students not only to learn mathematical content, but also to use and value mathematical habits of mind. It helps students become pattern sniffers, experimenters, describers, tinkerers, inventors, visualizers, conjecturers, and guessers. Curriculum materials guide students in developing and applying these habits as they explore specific mathematical content. The materials allow high school students to become comfortable with hard problems, see the benefit of systematization and abstraction, and look for and develop new ways of describing situations.

Program Components

A hardcover student text is available from the publisher. The text contains six chapters, allowing students to explore one area of mathematics deeply (for example, dissections or optimization), seeing how it connects to many different pieces of content. These larger themes help students relate the pieces of content to each other and to larger mathematical ideas.

Teacher materials include a hardcover Teacher's Guide and a softbound Solution and Problem Solving Resources. In addition, the Teacher Resource Package includes the *Connected Geometry* CD-ROM, which contains student activities (those in the student text as well as others), teachers' commentary, and solutions—all in modular format.

Assessment Materials

Connected Geometry provides several assessment texts, including Resource, Assessment Resource, and Teacher Resources (masters). These materials are available from the publisher.

Professional Development Services Available

Contact the publisher for details.

Implementation Costs

Contact the publisher for current pricing. Student edition: \$47.97; Teacher Resource Package: \$219.99 (components also sold separately).

Contacts and Web Sites

Developer

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<http://www.edc.org/LTT/ConnGeo>

Publisher

Alice Foster, Glencoe/McGraw-Hill, 8787 Orion Place, Columbus, OH 43240
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Customer Service: 800-334-7344
<http://www.glencoe.com>

Science Programs

Insights

Grade Level



K 2 4 6 8 10 12 +

The *Insights* curriculum consists of 17 modules that represent a balance of life, earth, and physical science. The modules also highlight six major science themes: systems, change, structure and function, diversity, cause and effect, and energy. Each module is designed for use at either grades K–1, 2–3, 4–5, or 6, is intended to last six to eight weeks, and contains 12 to 20 age-appropriate learning experiences (or hands-on inquiry activities) in which teachers guide students as they explore new concepts. The modules are designed for use in self-contained elementary classrooms and can be used as a core curriculum, to be expanded as necessary, or individually in conjunction with existing programs.

Each module guides the students through an in-depth study of the topic, highlighting key science concepts and relevant major themes. All the modules are designed to build student understanding of and skills in scientific inquiry. For example, through a study of water, oil, and corn syrup, the Liquids module addresses major concepts such as the physical properties of liquids (density, cohesion, viscosity, and color). Additionally, it gives students experience with the ideas that all liquids pour and take the shape of their containers, solid objects either sink or float in liquids, and the relationship between an object’s buoyancy and weight and its density and shape.

Insights modules are designed to build on students’ prior knowledge, experience, and strengths. Each module is designed around a topic of interest to the students, which provides a context for standards-based classroom experiences. The main structure of each learning experience is the Teaching Sequence, which is divided into four phases: Getting Started, Exploring and Discovering, Processing for Meaning, and Extending the Learning Experience.

Language development is an area of emphasis in all modules. The modules emphasize small and large group discussion as well as the use of class charts, science notebooks, and home-school activities, all designed to encourage students to record and analyze their work. The materials encourage teachers to integrate science with the rest of the elementary curriculum, particularly language arts and mathematics, allowing for the development of skills in those areas.

Program Components

The *Insights* program consists of a Teacher’s Guide and a Materials Kit. The Teacher’s Guide begins with an introduction that provides an overview of the module and a discussion of the frameworks around which the curriculum is designed. It also provides a materials list and classroom management tips. There are teaching sequences for each chapter, otherwise known as “learning experiences,” which include: overview, objectives, suggested time, science terms, materials, advance preparation, teaching sequence, assessment, and extensions. There is no student book for the modules. Each Teacher’s Guide includes reproducible masters for student notebook pages, group recording sheets, and home-school work assignments. Each Materials Kit includes materials to teach the module to a class of 32 students. Some materials are consumable and will need to be replaced before using the kit again.

Assessment Materials

The *Insights* modules have several components for assessment, including an Introductory Questionnaire, Daily Assessment Strategies, Embedded Assessments, and Final Assessments. The Teacher's Guide offers assistance to teachers in analyzing the Pre- and Final Assessments and includes a suggested scoring rubric.

Other Language Versions

The student and group pages are available in Spanish.

Professional Development Services Available

The K–12 Science Curriculum Dissemination Center (see entry on page 126) offers seminars that provide an introduction and overview to this and other science education programs and that guide districts in the selection, adoption, and implementation of exemplary science instructional materials. The Center also offers customized technical assistance services.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

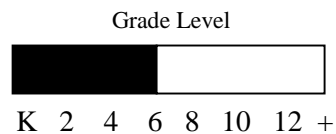
Developer

Karen Worth, Education Development Center, Inc., 55 Chapel Street, Newton, MA 02458-1060 Phone: 617-969-7100; Fax: 617-969-3401; E-mail: kworth@edc.org
<http://www.edc.org/CSE/imd/insights3.html>

Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, PO Box 1840, Dubuque, IA 52004-1840
Phone: 800-228-0810; Fax: 800-772-9165; E-mail: mpriestm@kendallhunt.com
<http://www.kendallhunt.com/elhi/insights.html>

Full Option Science System (FOSS)



Full Option Science System (FOSS) is a modular science program comprised of 27 modules. There are five modules at the kindergarten level, six for grades 1 and 2, eight for grades 3 and 4, and eight for grades 5 and 6. The modules are organized under four strands: Life Science, Physical Science, Earth Science, and Scientific Reasoning and Technology. The modular structure of the *FOSS* program is intended to give teachers the opportunity to adapt and implement the materials according to their own programs.

The modules have between three and six investigations that focus on the module topic: Balance and Motion, for example, includes three activities, and through exploration of stable and unstable systems introduces students to concepts including balance and stability. Students participate in spinning and rolling activities to learn about motion, slope, and rotation. As they explore, they become more aware of how to control variables to produce desired outcomes.

The *FOSS* program is organized into seven scientific-thinking processes, arranged as a developmental sequence related to cognitive stages: observing, communicating, comparing, organizing, relating, inferring, and applying. Each investigation is organized as follows:

- Purpose: what the students will do in that investigation
- At a Glance: a chart that provides inquiry questions, investigation summary, science content, and assessment opportunities
- Background for the Teacher: an adult discussion of the content related to specific concepts in the investigation
- Teaching Children About...: a summary of research relevant to the module, suggesting ways the teacher can use that information to motivate students to think about new ideas and connections to other areas of study
- Getting Ready: what the teacher needs to do to prepare for the lesson
- Guiding the Investigation: a detailed description for the teacher of the sequence of steps required for implementing each part of the lesson.

Program Components

Each *FOSS* module comes with a Teacher Guide, a Teacher Preparation Video, a package of eight *FOSS* Science Stories, and all of the student investigation materials. The Teacher Guide is in 10 sections; the first and last sections, *FOSS* Introduction and *FOSS* Web site, are the same in every module. The other eight sections vary according to the topic, but include a general overview of the module, list of materials, Investigations (called “Activities” in kindergarten), reproducible masters, formative and summative assessments, assessment masters, stories and reading materials related to the module, and a resource list. An Equipment Kit contains materials needed to conduct the activities. There is a limited amount of consumable materials; replacements can be ordered in bulk or individually. A Teacher Preparation Video for every module provides a look at classrooms where the module is in use. *FOSS* also has a Science Stories component that includes narrative stories, expository readings, technical readings, and historical accounts.

The *FOSS* Web site, <http://www.fossweb.com>, offers additional extension activities for home or school, such as teaching tips and interactive simulations to communicate with other students and scientists.

Assessment Materials

The *FOSS* program includes both formative and summative assessments. Formative assessments help teachers monitor student progress throughout a module. They are woven into the learning experiences and take the form of informal teacher observation, student work, and performance assessment tasks. Summative assessments provide an overall measure of the learning outcomes at the end of the module. *FOSS* includes the end-of-module assessment and portfolio of accumulated work as tools for summative assessment.

Other Language Versions

All student material comes in Spanish as well as English. A Spanish Supplement to the Teacher Guide can be ordered separately.

Professional Development Services Available

Both Delta Education and the Lawrence Hall of Science at the University of California at Berkeley offer *FOSS* Institutes. *FOSS* Introductory Institutes, Leadership Institutes, and teacher workshops on specific modules are offered throughout the country. For more information contact Pam Frisoni (below), or the K–12 Science Curriculum Dissemination Center (see separate entry on page 126) offers seminars that provide an introduction and overview to this and other science education programs, and which also guide districts in the selection, adoption, and implementation of exemplary science instructional materials. The K–12 Center can also offer customized technical assistance services.

Recognitions Received

FOSS was developed with support from the National Science Foundation and is recognized by NSF as an exemplary program. *FOSS* is used widely in the NSF Implementation and Dissemination Centers.

Implementation Costs

Because the program is modular, implementation costs will vary depending on the size of the school or district. Individual modules range from \$350 to \$650.

Contacts and Web Sites

Developer

Linda DeLucchi, Lawrence Hall of Science, University of California, Berkeley, CA 94720
Phone: 510-642-8941; E-mail: ldelucch@uclink4.berkeley.edu
<http://www.lhs.berkeley.edu/FOSS>

Publisher

Pam Frisoni, Delta Education, 80 Northwest Boulevard, P.O. Box 3000, Nashua, NH 03061-3000
Phone: 800-258-1302 ext. 503
<http://www.delta-ed.com/teachers/science/foss.html>

Science and Technology for Children (STC)

Grade Level



K 2 4 6 8 10 12 +

Science and Technology for Children® (STC) is a comprehensive elementary science curriculum for grades K–6 containing 24 units—four units at each grade level (except K–1, which is combined). Each is in one of the following strands: life, earth, and physical sciences and technological design. Although each unit was developed for use at a particular grade level, any *STC* unit may be used one grade above or below the designated level.

Each *STC* unit generally has 16 lessons with hands-on investigations that are structured around and explore in depth a specific topic within the science strand. For example, in the “Organisms” unit, students explore the similarities among and differences between a variety of plants and animals, and learn about their basic and special needs. They identify characteristics of organisms, plant seeds, watch them grow, and study animals such as snails and guppies. Through these activities, students learn about the diversity of living things, how organisms grow and change, and how plants and animals coexist. Teachers can use the four units per grade level to comprise the science curriculum for the entire school year or use one or two individual units as supplements to other curriculum pieces.

STC is aligned with the criteria for science content, teaching methods, and assessment set forth in the National Science Education Standards. A characteristic of the *STC* program is that the investigations encourage students to develop an appreciation for science, technology, and society. *STC*’s pedagogical approach to teaching science is represented in its learning cycle—focus, explore, reflect, apply—which forms the basis of the sequencing of instructional activities.

Program Components

The *STC* program units consist of a Teacher’s Guide, a Student Activity Book, and a Materials Kit. Every Teacher’s Guide contains a unit overview, master materials list, and a list of unit goals; all new Teacher’s Guides, available in January 2002, will also contain assessment strategies for each goal and information on how to incorporate writing into science learning. The main section of the Teacher’s Guide provides step-by-step guidance for presenting each lesson in the unit. Lessons include: overview and objectives, background information, materials list, advance preparation, lesson procedures, final activities, extensions, reading selections, safety notes, assessment suggestions, and reproducible student sheets. Appendices in the Teacher’s Guide offer a bibliography (books and other resources for teachers and students that complement the unit), assessment tools, blackline masters, and additional unit-specific information such as care and handling instructions for live materials. The Student Activity Book (for grades 3–6 only) contains lesson outlines, steps to guide students through the activities in each lesson, reading selections, and instructions for performing classroom investigations. Optional Student Notebooks for grade K/1–2 units contain the reproducible student sheets found in the Teacher’s Guide. The Materials Kit includes most of the materials needed to implement the unit. A teacher resource video accompanying each unit portrays demonstrations by a master teacher on setting up and using the materials in the science kit as well as students engaged in the unit activities. *STC* Discovery Decks are resource cards that add instructional opportunities to students’ learning experiences in the units for grades 4–6. The publisher,

Carolina Biological Supply Company (see below), also publishes *STC® Update*, a newsletter for users of the *STC* curriculum, with classroom management tips and ideas for extending *STC* units.

Assessment Materials

The purpose of the *STC* assessment activities is to determine students' scientific-reasoning skills as well as their understanding of science concepts. The assessment opportunities include pre- and post-unit assessments, embedded assessments, final assessments, and student self-assessments.

Other Language Versions

Spanish translations of student books for all units are available on the *STC® en Español* CD-ROM, included in each unit.

Professional Development Services Available

Carolina Biological Supply Company provides overview presentations on *STC*'s goals, development, and philosophy, along with a description of typical unit components and the logistics of implementation. Carolina's curriculum consultants also furnish in-service training for any *STC* unit.

Evidence of Effectiveness

See Einstein Project's Cornerstone Study (www.einsteinproject.org/cornerstone/index.shtml); Preliminary Comparison of Michigan Statewide Testing Results in *STC*-Adopted Districts (www.carolina.com/stc/publications/michigan.pdf); Valle Imperial Project in Science (VIPS) Four-Year Comparison of Student Achievement Data, 1995–99 (www.carolina.com/stc/publications/vips.pdf).

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

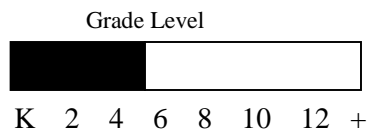
Developer

The National Science Resources Center (NSRC), Smithsonian Institution—MRC 403, Arts and Industries Building Room 1201, Washington, DC 20560
Phone: 202-357-2555; Fax: 202-786-2028; E-mail: nsrcsite@si.edu
<http://www.si.edu/nsrc/pubs/stc/overv.htm>

Publisher

Carolina Biological Supply Company, 2700 York Rd., Burlington, NC 27215
Phone (ordering information): 800-334-5551; Phone (technical support): 800-227-1150; E-mail: stc@carolina.com
<http://www.carolina.com/stc>

BSCS Science T.R.A.C.S.



BSCS Science T.R.A.C.S. (Teaching Relevant Activities for Concepts and Skills) is a modular science program. It is a comprehensive K–5 science program that consists of year-long modules (physical science, earth and space science, life science, and science and technology). The program is based on the “BSCS 5 E” instructional model in which children Engage, Explore, Explain, Elaborate, and Evaluate as they construct their understanding of science concepts over time. Through investigations into the weather, the sun, the moon, the stars, plants and animals, electrical systems, ecosystems, and other topics, students develop an awareness of the world and how it works. Students become engaged in the processes of scientific inquiry and technological design by asking questions, conducting investigations, using tools, finding evidence, keeping reflective journals, and sharing their evidence and ideas.

With *T.R.A.C.S.*, students are partners with their teachers in the assessment process. Within each lesson, students check their own understanding individually or with their team. Performance and other forms of alternative assessment are clearly outlined for teachers.

Each of the *T.R.A.C.S.* modules consists of 7 to 15 lessons. Generally, the modules are designed to be taught over the course of 25 to 40 class sessions, with 25-minute class sessions for younger children and sessions lasting 45 to 60 minutes for older children.

Program Components

The *T.R.A.C.S.* program consists of the following components: a Teacher’s How-To Handbook; a Teacher’s Edition for each of the 21 K–5 modules; a Student Guide for each module grades 1–5; and grade-level Kits of nonconsumable items, consumables, and collaborative materials for sharing across several classrooms.

The Student Guides serve a number of purposes, among them to help students learn to conduct inquiries both within a team and alone, to help develop science and technology concepts and skills, and to develop skills for reading in science. The guides inform the students of the purposes of record keeping in their science work. The Teacher’s How-to Handbook contains a program overview and essays on topics essential to the effective use of the program, such as managing the classroom for inquiry science and assessing student understanding. Each Teacher’s Edition includes a program overview, a module overview, a master list of supplies, a section on Teaching and Assessment Strategies, blackline masters, and information on related children’s literature and multimedia resources.

Assessment Materials

T.R.A.C.S. also provides a wide variety of assessment strategies, emphasizing that assessment must be continuously interwoven with daily instruction. General assessment strategies are discussed in the Teacher’s How-To Handbook. The following specific assessment elements, along with narrative explanations for how to use them, are included in the program: Journals and Folders, Collaborative Learning, Checking Understanding, Assessment Checklists, Making Predictions, and Performance Tasks.

Other Language Version Available

Teacher Editions and Student Guides are available in Spanish.

Professional Development Services Available

The K–12 Science Curriculum Dissemination Center (see separate entry on page 126) offers seminars that provide an introduction and overview to this and other science education programs, and which also guide districts in the selection, adoption, and implementation of exemplary science instructional materials. The K–12 Center can also offer customized technical assistance services.

Implementation Costs

Contact the publisher for complete and current pricing. Prices include the Teacher How To Handbook: \$19.99; Grade 5 Teacher Edition per module: \$39.99; Grade 5 Student Guide per module: \$12.99; Grade 5 Complete Kit: \$409.99.

Contacts and Web Sites

Developer

Biological Science's Curriculum Study, Attn: BSCS Science T.R.A.C.S., 5415 Mark Dabling Blvd., Colorado Springs, CO 80918-3842

E-mail: tracs@bscs.org

http://www.bscs.org/cp_el_tracs.html

Publisher

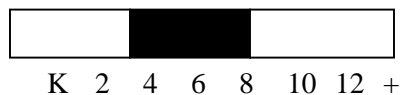
Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002

Phone: 800-228-0810

<http://www.kendallhunt.com/elhi>

ARIES: Astronomy-Based Physical Science

Grade Level



ARIES is an astronomy-based curriculum for grades 3-8 that helps students develop deep conceptual understanding of important scientific principles. Students uncover their prior knowledge, pose questions and make predictions, and construct models of nature based on their observations. They build waterwheels to understand principles of energy; model the movement of the Earth in space and the apparent motion of the Sun, Moon and stars; investigate light and color using filters; experiment with magnets; and much more.

ARIES features eight self-contained modules that may be used in any sequence to fit the needs of the local science curriculum. Each requires roughly sixteen weeks of instructional time. Some modules may be extended over the school year in order to gather data from season to season. In general, teachers use two *ARIES* modules each year.

Four of the modules focus primarily on topics in astronomy: Exploring Time, Exploring the Earth in Motion, Exploring the Moon and Stars, and Exploring Navigation. Astronomy introduces topics fundamental to physical science in the other four modules: Exploring Light and Color, Exploring Energy, Exploring Waves, and Exploring Motion and Forces.

ARIES explorations can also be integrated with other subject areas. Many involve basic mathematics skills, some develop historical or geographic contexts, and all of them involve speaking, listening, and writing.

Program Components

Each of the eight *ARIES* modules consists of a Teacher Manual, student science journals, and an apparatus bin. Students construct their own equipment using the materials in the bin. The science journal supports student learning by asking them to articulate their prior ideas, formulate questions and predictions, construct and use apparatus, record observations and organize data, draw conclusions, and explain their reasoning.

The Teacher Manuals include:

- Rationale and learning objectives
- Historical and scientific background
- Questions to elicit prior knowledge and predictions
- Teaching guides and procedure summaries
- Questions to stimulate discussion and interpretation of results
- Lesson extensions and curriculum connections
- Variety of assessment options.

Professional Development Services Available

Discovery learning workshops based on the *ARIES* model are offered at many Challenger Learning Centers nationwide. Contact the publisher for more information.

Implementation Costs

Contact the publisher for current pricing; classrooms sets range in price from \$178 to \$398.

Contacts and Web Sites

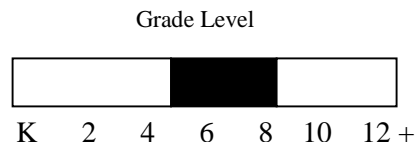
Developer

R. Bruce Ward, Harvard-Smithsonian Center for Astrophysics
Phone: 617-495-5434; E-mail: bward@cfa.harvard.edu
<http://cfa-www.harvard.edu>

Publisher

Pamela J. Olheiser, Charlesbridge Publishing, 85 Main St., Watertown, MA 02472
Phone: 617-926-0329; E-mail: polheiser@charlesbridge.com
<http://www.charlesbridge.com>

Investigating Earth Systems



Investigating Earth Systems is a modular science curriculum component for middle schools. It includes nine activity-based modules designed for grades 5–8. Modules are grouped into three grade levels: grades 5–6, 6–7, and 7–8.

Modules introduce concepts through a series of Investigations (six to seven per unit), which are presented within a standard format that includes both the skills and the content students are expected to learn. Every investigation follows a learning cycle including: a problem or a question, a series of activities that lead students through finding possible answers to the challenge, content notes for students’ background information, and a “Review and Reflect” section that encourages students to reflect on what they have done and summarize in their journals what they have learned. A section on thinking about scientific inquiry guides students on a process for thinking back on the use of the inquiry.

Five key scientific concepts underlie *Investigating Earth Systems*: (1) Earth is a set of closely linked systems; (2) Earth’s processes are powered by two sources: the sun and Earth’s own inner heat; (3) the geology of Earth is dynamic and has evolved slowly over 4.5 billion years; (4) the geological evolution of Earth has left a record of its history that geoscientists interpret; (5) we depend upon Earth’s resources—both mined and grown. Collectively, the modules are designed to encourage students to think about Earth as a system.

Program Components

Teaching resources for every module include a Teacher’s Guide, a Student Book, and a Materials Kit. The Teacher’s Guide provides teachers with tips, suggestions, and detailed notes to support the teaching of each section of the investigation in the student book. It also alerts teachers to the assessment opportunities in every investigation and the correlation of the concepts with the NSES Content Standards and the AAAS Benchmarks. The Teacher’s Guide includes appendices at the end of every module with content background information. The Student Book follows the same format for each module and includes sections on “Introducing Inquiry Processes,” “Keeping Your Investigation Journal,” and “Introducing the Module.” Adjunct products are planned for *Investigating Earth Systems*, including support video programs for each module, a CD-ROM supporting the overall project, a Web site for teacher and student users, and additional modules. Modules currently available include: Investigating Soil (grades 5–6), Investigating Oceans (5–6) Investigating Materials and Minerals (5–6), Investigating Water as a Resource (6–7), Investigating Rocks and Landforms (6–7), Investigating Dynamic Earth (7–8), Fossils (7–8), Investigating Climate and Weather (6–7), and Investigating Energy Resources (7–8). Materials Kits are available that include both durable and consumable items.

Professional Development Services Available

The American Geological Institute (AGI) hosts Annual Curriculum Leadership Institutes to build a network of educators and geoscientists to support the adoption and implementation of *Investigating Earth Systems*. AGI also offers week-long professional development workshops each summer as well as one- and two-day workshops during the school year. The Publisher, It’s About Time, also provides

professional development services for users of the IES program, including introductory and implementation workshops, new-teacher and leadership institutes, and mentoring visits.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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Phone: 207-230-0045; E-mail: msmith@agiweb.org

<http://www.agiweb.org/ies>

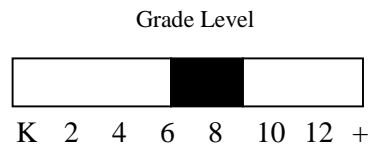
Publisher

It's About Time, 84 Business Park Drive, Armonk, NY 10504

Phone: 888-698-TIME; Fax: 914-273-2227

<http://www.its-about-time.com>

Event-Based Science (EBS)



The *Event-Based Science* (EBS) series is a module-based program designed for students in grades 6–9, with a focus on current events. The program targets concepts from the National Research Council’s Science in Personal and Social Perspectives Standards. The series has 18 modules designed to last 4 to 6 weeks, each focusing on different themes and concepts across the domains of earth, life, and physical sciences; modules look at real-life occurrences, problems, and challenges including populations, resources and environments, and natural hazards. The modules can be sequenced over all middle school grade levels and combined with other instructional materials to build a comprehensive middle school science program.

The intent of the *EBS* program is to place the study of science in a meaningful and interdisciplinary context in which students see the role that science plays in everyday life. For example, in “Hurricane!” students track a hurricane by plotting data, examining weather charts, making predictions, and comparing temperatures. Every unit includes hands-on investigations and explorations of authentic tasks designed to foster cooperative learning, open-ended activities, guided discussions, statistical analyses, and performance assessments.

One or two modules are typically used in a year, with teachers selecting particular units based on the district’s science standards, the local curriculum program, the interests of the student population, and their own background knowledge in specific topics. *EBS* is not a “stand alone” curriculum. By design, teachers and students must supplement each module with additional data about a specific event from various resources included as part of the materials, as the program suggests.

Program Components

The *EBS* program provides a Teacher’s Guide and a Student Edition. Each Teacher’s Guide offers a detailed explanation of the philosophy and pedagogy/instructional approach of the program as well as information about the flow of the teaching and learning experiences. The Teachers’ Guide includes suggestions for modifications in instructional strategies and classroom management, suggestions for stimulating group work, and facilitating discussion and student participation. The guide also gives strategies for supplementary activities and references to sources where students can find or request information. The Student Edition introduces students to the purpose and nature of the program. It explains the various components of the module, how to use them effectively, and guides students through the learning expectations. It also includes resources and background information to support student learning. *EBS* Kits are available for several of the modules. The *EBS* Web site includes a description of the overall program and the individual modules. It also features updated information about each event, with hints about how to supplement, modify, or exchange activities depending on current “events” in the news; links to organizations and resources for each module; teaching suggestions from the field; news coverage on late-breaking events; and more.

Assessment Materials

The modules include various types of assessments. Each science activity and the individual and group-work developed by the students have detailed and specifically designed assessments. Specific performance assessments are embedded within activities and tasks. A general performance assessment is included at the end of the unit. The unit culminates with a presentation of the final product developed by the team, which represents their conceptual understanding: journals, letters, written documents, and discussions in which they can defend their results and positions.

Professional Development Services Available

A network of certified *EBS* trainers provide free workshops to school and districts that purchase 35 class sets of *EBS* materials (the minimum required purchase depends on travel costs).

Evidence of Effectiveness

The U.S. Department of Education Expert Panel on Mathematics and Science Programs found evidence of significant gains in student understanding of earth science concepts. Evaluation studies were conducted during 1992–93, 1993–94, and 1994–95 at six test sites.

Recognitions Received

In 2000, the U.S. Department of Education Expert Panel on Mathematics and Science Programs designated *EBS* as a *promising* Science Program.

Implementation Costs

EBS books are \$9.95 for the student's edition, \$24.50 for the Teacher's Guide with video, and \$153 for a classroom set. A three-hour *EBS* workshop for 25 teachers is \$650, plus travel expenses.

Contacts and Web Sites

Developer

Russell Wright, Montgomery County Public Schools, Event Based Science Institute, Inc., 6609 Paxton Road, Rockville, MD 20852
Phone: 301-806-7252; Fax: 301-279-3153
<http://www.eventbasedscience.com>

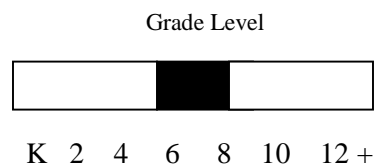
Publisher

Dale Seymour/Pearson Learning, 299 Jefferson Road, Parsippany, NJ 07054
Phone: 800-526-9907
<http://www.pearsonlearning.com>

Materials Information

Montgomery County Public Schools' Taylor Science Materials Center, 19501 White Ground Road, Boyds, MD 20841
Phone: 301-353-0866; Fax: 301-353-0870

Full Option Science System (FOSS) for Middle School



Full Option Science System (FOSS) for Middle School is a general science curriculum for students in grades 6–8. FOSS combines hands-on science with a strong technology component. The program is consistent with the National Science Education Standards concerning inquiry and depth of understanding, and provides opportunities to develop logical thinking and critical decision-making skills. Each course provides 9 to 12 weeks of activities and strategies to keep developing adolescents motivated and involved.

The curriculum is organized into topical units, called courses, under each of three strands: Earth and Space Science, Life Science, and Physical Science and Technology. Each course is an in-depth unit requiring 9 to 12 weeks of instruction. The units have approximately 10 investigations, each with 3 to 7 parts. Five courses are currently available (Human Brain and Senses, Planetary Science, Electronics, Earth History, and Diversity of Life), and four more courses are in development.

Program Components

Each unit includes a Teacher’s Guide, an Equipment Kit, a Lab Manual, a CD-ROM, and a Resources Book. The Teacher’s Guide includes materials preparation, goals and objectives, an at-a-glance investigation chart, science background, lesson plans, masters, answer sheets, assessments with masters and scoring guides, CD-ROM users guides, and references to other print, multimedia, and online resources. The Equipment Kit contains student laboratory equipment packaged for multiple classes, including class resource materials such as posters, maps, books, videos, and transparencies for use in the investigations. The Lab Manual contains student sheets and organizers for the investigations. A CD-ROM can be used as a whole-class demonstration tool as well as an individual or small-group interactive instructional tool. The Resources Book is a non-consumable, four-color student book that contains readings, images, and data. The CD-ROM and Resources Book serve as research and report preparation tools.

The FOSS Web site, <http://www.fossweb.com>, offers additional extension activities for home or school, such as teaching tips and interactive simulations to communicate with other students and scientists.

Assessment Materials

The middle school assessment is based on the same three variables as the elementary program: science content, conducting investigations, and building explanations. There are both formative and summative assessments. Formative assessments include informal notes, teacher observation, students sheets, student journals, quick writes, response sheets, and self-assessments. There is a mid-summative exam for each investigation and a final summative exam. Scoring guides are provided in the Teacher Guide for the assessments.

Professional Development Services Available

Both Delta Education and the Lawrence Hall of Science at the University of California at Berkeley offer *FOSS* Introductory Institutes, Leadership Institutes, and teacher workshops on specific modules throughout the country.

Evidence of Effectiveness

The program is too new for evidence of long-term effectiveness.

Recognitions Received

FOSS was developed with support from the National Science Foundation and is recognized by NSF as an exemplary program. *FOSS* is used widely in the NSF Implementation and Dissemination Centers.

Implementation Costs

Complete course kits range in price from \$1249 (for Planetary Science) to \$1949 (for Electronics).

Contacts and Web Sites

Developer

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<http://www.lhs.berkeley.edu/FOSS>

Publisher

Pam Frisoni, Delta Education, 80 Northwest Boulevard, P.O. Box 3000, Nashua, NH 03061-3000 Phone:
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Science and Technology Concepts for Middle Schools (STC/MS)

Grade Level



K 2 4 6 8 10 12 +

Science and Technology Concepts for Middle Schools[™] (STC/MS) is an eight-module, inquiry-centered, middle school curriculum developed by the National Science Resources Center (NSRC). Each *STC/MS* module provides opportunities for students to experience scientific phenomena firsthand. A comprehensive, research-based curriculum, *STC/MS* is aligned with the National Science Education Standards (NSES) of the National Research Council.

The *STC/MS* program builds on the skills and knowledge developed in the Science and Technology for Children® (STC®) curriculum, with content balanced among the life sciences, earth sciences, physical sciences, and technology. Each module is developed by teachers, scientists, and evaluators and is field-tested in urban, suburban, and rural classrooms nationwide. *STC/MS* modules are based on a four-stage learning cycle that is grounded in educational research and practice:

1. Students focus on what they already know about a topic.
2. Students explore a scientific phenomenon or concept, following a well-structured sequence of classroom investigations.
3. Students reflect on their observations, record them in science journals, draw conclusions, and share their findings with others.
4. Students apply their learning to real-life situations and to other areas of the curriculum.

The *STC/MS* modules are: Human Body Systems; Catastrophic Events; Properties of Matter; Energy, Machines, and Motion; Organisms—From Macro to Micro; Earth in Space; Light; and Electrical Energy and Circuit Design. The modules can be sequenced for two one-year courses, each year consisting of a module from each of the four science/technology strands, or as four one-semester courses for earth science, life science, physical science, and technology. Everything that the teacher and students need—a Teacher’s Guide, Student Guides, and the equipment and materials for five sections of 32 students—is included in the module kit. The *STC/MS* program materials also include assessment components, suggestions for the use of educational technology, and reading selections to broaden student learning.

Program Components

Each *STC/MS* Teacher’s Guide contains a matrix showing the alignment of that module’s content to the NSES content standards for grades 5–8. It also addresses how the module correlates to other aspects of the national standards (history of science, personal and social perspectives, etc.). In addition, the Teacher’s Guide provides background material on science and pedagogy, guidance on the preparation and setup of kit materials, and detailed instructions for facilitating classroom investigations. It also includes master copies of student record sheets and other materials, suggestions for relating science to other areas of the curriculum, and assessment strategies. The Student Guide is reusable and contains background information, step-by-step instructions that guide students through their classroom inquiries, reading selections, and safety tips. Each *STC/MS* five-class module kit contains the equipment and materials needed (except for some perishable items or materials commonly available from home or found in the

classroom) to present the module to five classes of 32 students. Refurbishing kits for replacing consumable materials in the module are available from the publisher, Carolina Biological Supply Company.

Available for purchase now are: Human Body Systems; Catastrophic Events; Properties of Matter and Energy; and Machines, and Motion. Available in fall 2002 will be: Organisms—From Macro to Micro; Earth in Space; Light; and Electrical Energy and Circuit Design.

The Catastrophic Events Five-Class Module Kit includes videos (Hurricanes; In the Path of a Killer Volcano; Natural Disasters; Newton's Apple [2 segments]; Geothermal Energy and Earthquakes; The Day the Earth Shook; and The Eruption of Mount St. Helens) and a CD-ROM, The Theory of Plate Tectonics.

Professional Development Services Available

Carolina Biological provides overview presentations on the goals, development, and philosophy of *STC/MS*, along with a description of typical unit components and the logistics of implementation. Carolina's curriculum consultants also furnish in-service training for any *STC/MS* unit.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

The National Science Resources Center (NSRC), Dr. Sally Shuler or Dr. Kitty Lou Smith, Project Directors, Smithsonian Institution—MRC 403, Arts and Industries Building Room 1201, Washington, DC 20560

Phone: 202-357-2555; Fax: 202-786-2028; E-mail: nsrcsite@si.edu

<http://www.si.edu/nsrc/stcms/overview.htm>

Publisher

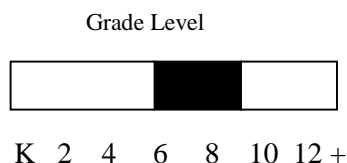
Cindy Morgan, Carolina Biological Supply Company, 2700 York Rd., Burlington, NC 27215

Phone (ordering information): 800-334-5551; Phone (technical support): 800-227-1150; E-mail:

stcms@carolina.com; cindy.morgan@carolina.com

<http://www.carolina.com/stcms>

BSCS Middle School Science & Technology



BSCS Middle School Science & Technology is a three-year program intended for grades 6–8 or 7–9. It uses a thematic approach to integrate major areas of science and technology. The curriculum comprises a full-year program for each grade level that uses a book organized around four units of broad, recurring themes. The program uses the “BSCS 5E” instructional model to structure the learning experience for students (Engage, Explore, Explain, Elaborate, and Evaluate). The activities and the concepts within each unit were designed to build on prior ones from the same and previous level(s).

Middle School Science & Technology includes three grade-level books: level A (Patterns of Change); level B (Diversity and Limits); and level C (Systems and Change). Each is divided into four units focused on the same four recurring themes: Personal Dimensions of Science and Technology, the Nature of Scientific Explanations, Technological Problem-Solving, and Science and Technology in Society. From level A to C, each theme has a different “focus question” and develops with increasing sophistication across the grade levels.

The first unit presents activities relevant to students’ lives in an effort to make concepts of science and technology applicable to the everyday environment and experience. The second unit emphasizes scientific explanations such as the theory of plate tectonics, evolution, and the particulate model of matter. The third unit emphasizes the principles of technology, such as the design process or the efficient use of energy resources. The fourth unit has students consider a major issue involving the impact on society of science and technology. These issues are recycling, genetic engineering, and overpopulation.

The materials also place a strong emphasis on cooperative learning strategies. The Teacher’s Edition provides specific recommendations for ways to facilitate group work. The Student Book provides indicators and directions to help students work with partners and ensure that their fellow students are working cooperatively.

Program Components

The Teacher’s Edition follows the development of each chapter and provides an overview, background information, a materials list, and strategies for presentation of each section of the chapter. It features pages from the Student Book and strategies for assisting students in the activities. A Teacher’s Resource Guide for each grade level (available from the publisher) includes all the necessary blackline masters for the lessons and activities, and also includes sections on adoption and implementation, correlation with the National Science Education Standards, background resources on cooperative learning, learning styles, concept mapping, safety, and tools for assessment. Each of the three levels comes with three videos, each about 20 minutes long, and engages the students in inquiries in the physical sciences. The Student Book provides complete procedures for carrying out the investigations and includes readings that explain and expand on concepts. Materials Kits are available for each unit.

Assessment Materials

The Teacher's Edition lists learning outcomes for each of the four units within the grade level. These outcomes are related to the more general and abstract concepts that are developed throughout the level. It also lists very specific outcomes and indicators of success related to skills and concepts for each activity within a chapter. Each chapter ends with the fifth "E"—the Evaluate activity, which allows the students and teachers to evaluate the students' understanding of the concepts in that chapter. At the end of each unit is a chapter that encompasses the evaluation stage. The students must use concepts and understand terms that were introduced in the unit, and then show how they can apply their understanding and skills.

Professional Development Services Available

Biological Sciences Curriculum Study (BSCS) offers implementation support through the publisher, Kendall/Hunt, which ranges from half-day in-service workshops to week-long summer institutes. These are conducted by BSCS staff or teachers who have been approved as trainers by BSCS.

Implementation Costs

Contact the publisher for current pricing. Level C prices include the Student Book: \$48.99; Teacher's Edition: \$99.99; Teacher's Resource Book: \$99.99; Non-consumable Kit: \$1,803.10; and Consumable Kit: \$624.99.

Contacts and Web Sites

Developer

Biological Sciences Curriculum Study, Attn: Middle School, 5414 Mark Dabling Blvd., Colorado Springs, CO 80918-3042
Phone: 719-531-5550; E-mail: middleschool@bscs.org
http://www.bscs.org/cp_ms_book.html

Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002 Phone: 800-542-6657; Fax: 563-589-1163; E-mail: mpriestm@kendallhunt.com
<http://www.kendallhunt.com/elhi/msst.html>

FACETS (Foundations and Challenges to Encourage Technology-Based Science)

Grade Level



K 2 4 6 8 10 12 +

FACETS (Foundations and Challenges to Encourage Technology-Based Science) is a middle school integrated science program developed by the Education and International Activities Division of the American Chemical Society (ACS), with funding from the National Science Foundation. *FACETS* is set of 24 stand-alone, interdisciplinary investigation modules, all of which deal with topics, issues, and events that are of high interest to middle school students (their bodies, clothes, food, adventure, the environment, their school, human behavior, and natural disasters). Each guide presents science, mathematics, and other curricular topics on what is called a “need to know” basis—students learn the concepts that they need to know as they investigate one major question per module. The nature of the modules suggests that teachers work with teachers in other content areas in the school to design cross-curricular experiences for the students. Topics present inquiry, technology, and science in a personal and social perspective. Units focus on a set of problem-solving skills that reflect the processes and strategies used by scientists in investigative research: defining a problem, finding information, testing explorations, using models and simulations, designing and making, collecting data, analyzing and checking data, drawing conclusions, communicating findings, and reflecting and connecting.

Each module is designed to engage students for three weeks, as they work toward completing a particular project; designing and testing a product; or presenting the findings from a study. Modules typically begin with an introduction to the topic followed by an average of six activities. Every module uses the following instructional approach:

- The Big Question: provides students with background information relevant to the topic under study
- Introduction: sets the scene for the investigation/activities
- Activities: provide a set of hands-on experiences. Each activity includes How to Go About It, Conclusions, and Reflections
- Looking At: provides content sections teachers and students can access when they need additional information throughout the module.

The investigations in *FACETS* offer cross-curricular opportunities, establishing connections with technology, math, language arts, and social studies. All subjects are treated as tools that teachers and students can use to aid the investigative process that characterizes teaching and learning throughout.

Program Components

The introduction to each *FACETS* Teacher’s Guide provides an overview of the program and the instructional style, reflections on learning, and advice on time management. Specific to each module are sections on: Investigation Strategies, Module Contents, Module Time Line, Materials, Background Information, and Sidebars (tips and hints for guiding particular activities and discussions). Each module has a Student Book that contains the investigations and activities that students will do and provides

students with questions to investigate, suggested activities, sample charts, data tables, presentation formats, special notes, and student readings.

Assessment Materials

Each module suggests a number of methods for teachers to assess student progress, including alternative strategies such as portfolios, performance assessment, debates, or a set of questions. A separate Assessment Guide, developed to accompany *FACETS*, provides information about embedding assessment into activities, developing scoring tools, scoring and grading, and how to involve students in assessment.

Professional Development Services Available

The American Chemical Society (ACS) offers *FACETS* professional development workshops for teachers. For more information contact Guy Bellerman at 202-872-6383, or e-mail g_bellerman@acs.org.

Implementation Costs

Contact the publisher for current pricing.

Contact and Web Site

Developer/Publisher

American Chemical Society, Office of Society Services, 1155 Sixteenth Street, NW, Washington, DC 20036

Phone: 800-227-5558; Fax: 202-872-6067; E-mail: education@acs.org

<http://www.chemistry.org>

SCIENCE 2000+

Grade Level



K 2 4 6 8 10 12 +

Science 2000+ is a multimedia, three-year science curriculum that takes an integrated, thematic approach to the earth, life, and physical sciences. At each grade level, the year-long course includes four nine-week units, connected by central themes and a narrative that sets a real-world context for the science content. Students address these problems by drawing information from CD-ROM-based multimedia resources (text, images, video, simulations, Web links) and supplements.

The *Science 2000+* program is framed around six themes identified by AAAS in *Science for All Americans*: Energy, Evolution, Patterns of Change, Scale and Structure, Stability, and Systems and Interactions. Key science concepts are addressed repeatedly throughout the four-unit *Science 2000+* program. Within each nine-week unit, the range of concepts addressed is broad. Teachers may narrow or change the scope of concepts covered in any *Science 2000+* unit using the editing function provided within the *Science 2000+* environment.

Lessons in the program appear in “clusters” that can be united by themes, disciplines, or topics selected by the teacher. Lessons can be used individually or grouped. The program also encourages teachers to design additional instructional materials such as new clusters or lessons. The *Science 2000+* software offers the teacher some latitude in organizing, managing, and delivering the program content. The *Science 2000+* program has the following print materials: 1) an Implementation Guide common to all units, 2) a Teacher Resource Guide specific to each unit, and 3) Student Activity Blackline masters specific to each unit.

For grades 6–8, each year has four nine-week units, each connected by a central theme or storyline. Each unit is divided into a series of clusters, and each cluster into a sequence of lessons. Each cluster and each lesson begins with an investigative question, which indicates the general purpose and focus of that unit. All lessons include investigations—which take the form of controlled experiments, field observations, text-based comprehension exercises, problem-solving activities, information categorization and summary, labeling of diagrams, or concept synthesis. Throughout the curriculum, students write reports, books, and articles.

Program Components

The student activities include a storyline, one or more investigations for each lesson of the unit and a vocabulary key. The Teacher Resource Guide includes cluster summaries, lesson plans, assessment sheets, and answer keys. The *Science 2000+* Implementation Guide includes several useful resources for teachers, including Correlation Matrices to *National Science Education Standards*, a glossary of Teacher Tips, and a Web-based update function.

Students working with *Science 2000+* have access to:

- Curriculum: storylines and investigations for each lesson linked to text, media resources

- Knowledge Bases: alphabetized databases of Biography, Glossary, Physical Science, Earth Science, Life Science, and Social Science articles and data
- Resources: Internet links, bibliography, safety tips, etc.
- Media: databases of images, video, maps and simulations
- The Notebook: a document-editing environment allowing each student to format text, images, or other media
- My Start Page: a personalized home page for each student, from which to navigate to familiar sites and resources within the *Science 2000+* environment.

Teachers have access to all student materials and resources. In the Curriculum section, they also have (password-protected) access to the following features:

- Overview: questions posed by the unit, the principal topics covered, and a summary of the instructional sequence, with links to all content resources
- Lesson Plan: a complete online guide to each lesson, fully linked to relevant resources and media
- Assessment Sheets
- Answer Keys
- Teaching Tips: short articles on teaching and classroom management, with links to related items.

Assessment Materials

Science 2000+ has several methods of evaluating student progress: special reports; application of concepts/knowledge learned to a new problem; portfolios of students' best work; and short answer objective tests. All *Science 2000+* units include one ready-made assessment sheet for each lesson (provided in print and on CD-ROM). These tests principally include application of concepts/knowledge and short answers.

Evidence of Effectiveness

The U.S. Department of Education has designated *Science 2000+* as a *promising* science program. Project 2061 has recognized it as one of two *satisfactory* middle school texts.

Implementation Costs

One grade-level site license is \$3,500, and contains an Installation CD-ROM and a Complete Teacher Kit with 12 CD-ROM's (three copies for each unit), one Implementation Guide, four Teacher Resource Guides (one per unit), and blackline masters (1 set per unit). Additional Teacher Kits can be purchased.

Contacts and Web Sites

Developer

Ellen Nelson, Decision Development Corporation Decision, 2303 Camino Ramon, Suite 220, San Ramon, CA 94583

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<http://www.ddc2000.com>

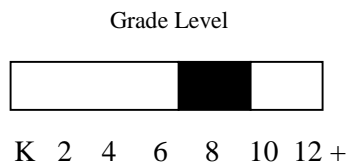
Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002

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Science Education for Public Understanding Program (SEPUP)



The *SEPUP* Modules are supplementary units for the secondary science program that use environmental issues to engage students in science experiences related to their own lives. The program is designed to encourage students to develop an understanding of the relationships among science, technology, people, the environment, and social issues. It involves activities, investigations, discussions, and debates based on readings and findings, as well as collection and interpretation of data. Students are expected to collect and evaluate scientific evidence, assess risks and benefits, ask questions, and make decisions based on science.

The program is comprised of 12 modules, each of which includes a series of conceptually related activities designed in two- to four-week units. Each unit has between 5 and 10 activities that range from experiments and simulations to exploration, collection, and examination of data. *SEPUP* Modules may be used in combination with other units, reference books, or materials, and several different modules are typically used over the course of a year.

The modules open with an activity calling for students' prior knowledge and experience of the issue under study. Then they conduct investigations to explore key ideas related to the general concept(s) in the modules. The investigations help students to consider the risks and benefits involved in the decisions they make and the social implications of evidence they identify. Finally, students conduct a qualitative and quantitative assessment of the risks, benefits, and implications as they prepare a substantial argument to support their decisions. The units are structured around topics such as pollution, risk comparison, plastics, toxic waste, hazardous materials, and environmental health risks.

Program Components

All *SEPUP* Modules include a Teacher's Guide, a complete Materials Kit, and student handouts. Each *SEPUP* Module includes all of the background information, and instructional resources (student worksheets, transparency masters, materials information, etc.) necessary for teaching the module. The Teacher's Guide is organized to include a conceptual overview of the major concepts and processes addressed in the module, an overview of the module itself, its activities, and information about students' role and work, and the activities along with instructional strategies and suggestions for how to present the concepts. The Materials Kit contains all of the necessary laboratory equipment and materials—containers and reagents—as well as printed support materials for students and teachers. Student materials contain directions for laboratory activities, investigations, and sample data tables.

Assessment Materials

Each module approaches assessment in two ways, through embedded assessments with questionnaires and end-of-unit tests from a test item bank. The modules include alternative strategies to assess progress

by collecting students' data from the investigations and analyzing how they organize and analyze that data; identify and use evidence; and use tables, models, and maps during manipulation of data. The modules also include questionnaires to assess students' development of concepts and skills. The test item bank assesses the science content, processes, and societal issues listed in the conceptual overview of each module. It contains multiple-choice, open-ended, and essay items.

Other Language Versions

Student pages are available in Spanish.

Professional Development Services Available

On-site professional development workshops are available. The basic training component consists of a two- to three-day, hands-on workshop series that covers the philosophy and instructional design of the program, plus the use of activities. The program publisher also offers workshops and seminars on a regular basis, varying in length and content based upon the needs of districts, schools, and teachers.

Recognitions Received

Recommended by the NSF "Review of Instructional Materials for Middle School Science," 1997.

Implementation Costs

Approximately \$10 to \$60 per class (kits serve five classes, with prices from \$35 to \$300 per kit).

Evidence of Effectiveness for all SEPUP programs (see below)

Refer to the publisher's research page at www.sepup.com/research.cfm.

Professional Development Services Available for all SEPUP programs (see below)

The publisher, Lab-Aids, provides on-site support for professional development related to implementation these programs. Workshops are provided for teachers, administrators, parents, or others interested on request. Initial teacher training generally consists of three to five days and mid-year follow-up. For small groups, professional development is provided on a regional basis.

Contacts and Web Sites

for all SEPUP programs (see below)

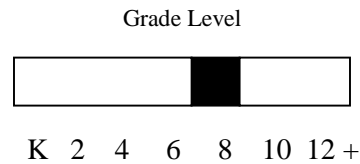
Developer

Lawrence Hall of Science, University of California, Berkeley, CA 94720-5200
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<http://www.lhs.berkeley.edu/SEPUP/sali.html>

Publisher

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<http://www.lab-aids.com>
<http://www.sepup.com>

SEPUP's Science and Life Issues (SALI)



Science and Life Issues (SALI) is an issue-oriented, integrated science course that emphasizes the life/health sciences. The course is intended to serve as an individual year-long program, or as part of a two-year integrated science sequence with *Issues, Evidence and You*, SEPUP's physical science-oriented course (see the separate summary). The course consists of seven units, and each unit contains a varying number of lessons designed within a range of instructional approaches that include different types of activities such as: Investigations, View and Reflect, Modeling, Reading, Laboratory, and Talking It Over.

A major goal of the instructional approach in *SALI*'s investigations is to provide a sound foundation for evidence-based decision making about science and life issues. *SALI* materials approach science from a student's perspective, rather than that of a scientist. Also, the program intends to address students' prior conceptions using a learning-cycle model of instruction.

Program Components

A complete Materials Kit for up to five classes of 32 students is provided for the entire academic year. The Student Book guides students through the activities and provides related readings and sample tables to collect observations and record data. Students are also expected to keep a science journal. The Teacher's Guide assists teachers throughout the implementation of each learning experience or activity, which is followed by blackline masters.

Assessment Materials

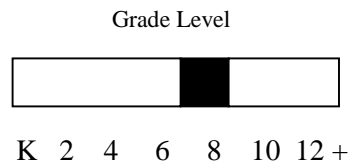
The authentic and embedded assessment system developed for the *Issues, Evidence, and You* program has been adapted for *SALI* (see the *IEY* summary). Assessment resources and instruction are included in the Teacher's Guide.

Lessons are provided for extensions to the "Our Genes, Our Selves" unit that use the Genscope™ software. The *SALI* page of the SEPUP Web site provides links to resources on the Web.

Implementation Costs

A complete SALI classroom module, which supports this year-long laboratory course, costs \$5,259.

SEPUP's Issues, Evidence and You (IEY)



Issues, Evidence and You (IEY) focuses on environmental issues in a social context. The program builds upon earlier SEPUP modules (see separate entries), and past users will recognize some of the features and best lessons from these materials. It addresses social issues in a way that recognizes students' increasing ability to think abstractly and builds upon their need for peer interaction and support. It can serve as the physical science component of an integrated science program (physical, life, and earth science) or as a year-long physical science program. The course consists of 65 activities or investigations presented in a conceptual sequence. The instructional times of the activities vary from one to three class periods. The curriculum can accompany Science and Life Issues (SALI; see separate entry). The program has four parts, each focusing on a different societal issue: Water Usage & Safety; Materials Science Energy Use; and Environmental Impact.

Students are assessed on five variables, or performance areas, which represent student learning in terms of the core concepts of *IEY*. These include Designing and Conducting Investigations, Evidence and Trade-Offs, Understanding Concepts, Communicating Scientific Information, and Group Interactions.

Program Components

The *IEY* program includes a Teacher's Guide, a Student Book, assessment resources, and a Materials Kit. The Teacher's Guide provides an overview, a rationale for each activity, a materials list, a teaching summary and teaching procedures, and a list of assessment opportunities. It also includes suggestions for modifying printed materials in order to meet the needs and interests of students, as well as background information, pedagogical and assessment strategies, and specific resources. The Student Book guides the investigations and provides related readings and sample data tables. The Materials Kit contains materials needed for the entire academic year; no other special equipment or technology is required.

Assessment Materials

The assessment system of *IEY* assumes assessment to be continuous and integral to the students' instructional experiences. The design includes eight components that attempt to guide the teacher in assessing student progress. The *IEY* Assessment System includes assessment tasks and scoring guides, assessment blueprints, exemplars of student work, performance maps that represent student development of the SEPUP Variables, and additional assessment activities.

Recognitions Received

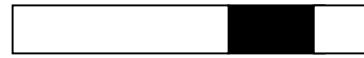
IEY was recommended by the NSF "Review of Instructional Materials for Middle School Science," 1997.

Implementation Costs

A complete *IEY* classroom module, which supports this year-long laboratory course, costs \$4,805.

SEPUP's Science and Sustainability

Grade Level



K 2 4 6 8 10 12 +

Science and Sustainability is a full-year integrated high school science curriculum in which hands-on activities predominate. The program includes concepts and topics from physics, chemistry, biology, and earth science. Each module concentrates on a broad theme involving local and global issues related to sustainability. The modules are intended to be followed in sequence, with early assignments providing references to and a foundation for later activities. *Science and Sustainability* is intended for heterogeneously grouped classes, with many lab experiences designed to challenge higher-performing students.

Science and Sustainability organizes its content according to four major themes (Living on Earth, Feeding the World, Using Earth's Resources, and Moving the World), each of which is divided into around 10 groupings, comparable to textbook chapters. These groupings are called Activities, comprising two to four lessons, each focused on a particular topic or question related to the overall Activity. Virtually all of the lessons in *Science and Sustainability* ask students to engage in aspects of scientific inquiry. Some lessons focus on planning for collecting evidence and observations. In others, students carry out investigations, many of which require quantitative problem-solving.

Program Components

The entire program includes a hardcover student textbook, a Teacher's Guide, and an Equipment Kit. Of the two to four lessons in each activity, at least one is a hands-on. Many of the lessons that refer to social issues depend upon a Sierra Club book called *Material World: A Global Family Portrait*. The Teacher's Guide provides an overview; a section on teaching procedures; guidelines for advance preparation; materials, resources, and organisms; links to other lessons and activities; and key concepts and vocabulary. The Equipment Kit contains several pieces of specially designed laboratory equipment. Some equipment is not included. Each kit contains materials for three classes of 32 students (working in pairs). A *Science and Sustainability* Web site provides frequently updated information to teachers, such as assistance with use of technology, A/V, and Web-based resources, and assessment item files that can be modified.

Assessment Materials

Science and Sustainability uses embedded assessments. Teachers can assess student's progress through their journals, and the program provides a generic rubric for assessing their cooperative learning skills. Students are assessed according to five major variables: Designing Investigations, Analyzing Data, Evidence and Trade-Offs, Understanding Concepts, and Communication of Scientific Information. The Teacher's Guide provides various assessment items and tasks as well as a rubric. There is also an Item Bank containing additional questions for each of the Activities that could be used for tests and quizzes.

Implementation Costs

The *Science and Sustainability* course, including enough materials for use with 3 classes of 32 students, is available for \$6,352; all items can also be purchased separately.

Prime Science

Grade Level



K 2 4 6 8 10 12 +

Prime Science is a comprehensive program spanning three years of middle school and two years of high school. Levels A, B, and C are designed for middle school, levels 1 and 2 for high school. These five levels have been organized around a spiral content structure so that development of concepts and topics are visited several times over the course of the five-year program. The program is “context-based” and “activity-led” and uses topics that are relevant to students’ lives. Each of the five texts is meant to cover a full-year science course and is divided into chapters that are theme-based. The program addressed thirteen topics that are spread relatively equally among the five years:

- Processes of Life
- Similarities and Differences in Living Things
- Environment and How We Affect It
- Natural Cycles and How We Affect Them
- The Earth and Its Surroundings
- Materials and How We Use Them
- Explaining How Materials Behave
- How Materials Can Be Changed
- Sound Waves and Electromagnetic Radiation
- Using Electricity and Magnetism
- Energy Resources and Transfer
- Forces and How We Use Them
- Earth and the Universe.

Most of the lessons consist of activities in which students are active, and the students’ texts guide them in designing and thinking about their own learning experiences. The program has a scope and sequence that outlines where concepts and processes are addressed, revisited, and further developed over the five levels of the program. Teachers can choose the order to introduce the chapters and their corresponding concepts.

Program Components

Prime Science has a Teacher’s Guide and a Student Text. Each lesson is divided into several sections that range in time from 10 minutes to several hours. Each lesson has several activities, which focus on a phenomenon or problem, and introduces several concepts or processes. The Teacher’s Guide describes the key points of each lesson and activity, and provides detailed instructions for carrying out suggested activities. There are recommendations for the amount of time devoted to each lesson and for providing answers to questions presented in the student text; background information is also provided to assist with facilitating discussions. The guides also contain handouts teachers can use to individualize instruction to some extent.

Assessment Materials

The program includes several kinds of assessment tools that can be used by the teacher, including Summary Discussions at the ends of chapters and Things To Do, tasks that can be used for assessing

student progress. The program also provides test bank computer disks with assessment items for each chapter and questions in the Teacher's Guide that can be used for chapter tests.

Other Language Versions

Student materials for grades 6–8 are available in Spanish.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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Foundational Approaches in Science Teaching (FAST)

Grade Level



K 2 4 6 8 10 12 +

The *Foundational Approaches in Science Teaching* (FAST) program is a sequence of three inquiry science courses designed specifically to address the developmental needs of students aged 12 to 15. The three courses are *FAST 1*, The Local Environment; *FAST 2*, Matter and Energy in the Biosphere; and *FAST 3*, Change over Time. Designed for students in grades 6–10 with a wide spectrum of abilities, this integrated, sequential curriculum allows for three or four years of study.

In each course, content is organized into three strands called physical science, ecology, and relational study. Relational study focuses on the interrelationships of the science disciplines and the interactions of science and society. The goal of this comprehensive program is the development of a scientifically literate student who has (a) the background necessary for understanding environmental concerns arising in our technological society and (b) the foundational tools for further study in the sciences. The principal objectives of *FAST* are to develop knowledge of concepts that are foundational to modern science and to develop laboratory and thinking skills, such as using symbolic tools employed in science, engaging in scientific inquiry, and using scientific knowledge for making decisions.

Each area of science is studied extensively and then brought together through study of the ecology of the local environment. The content reflects important scientific ideas, processes, and the nature of scientific inquiry. The instructional approach enables students to build incrementally on their prior learning and experiences, by repeatedly using skills introduced early in the program in new contexts. Active engagement in laboratory exercises or field experiences consumes approximately 75 percent of class time. Remaining class time is spent on data collection, discussion, literature research, and report writing. Special emphasis is placed on students communicating what they are learning through writing, oral reporting, project work, graphing, flowcharting, and diagramming.

Program Components

Each *FAST* course includes a Student Book, a Teacher’s Book, an Evaluation Guide, and a Student Record Book. Each course also comes with reference books related to the topics covered in that year. A *FAST* Instructional Guide provides an overview of all three *FAST* courses, with goals and objectives, course content, strategies for managing space and time, and detailed descriptions of materials used by students and teachers. Classroom sets of special equipment needed for some *FAST* experiments are also available. For example, student materials for *FAST 3* include “Stars in Mind,” sky maps, and the “Ostrich Bay Environmental Simulation Game.” Teacher materials include a *FAST* Instructional Guide and visual aid masters. The Archimedes Laboratory is an interactive program designed to help students grasp and use concepts of mass, volume, buoyancy, and density.

Assessment Materials

FAST provides a variety of assessment instruments and methods and a detailed Evaluation Guide for each level of the program. Assessment is embedded in day-to-day instruction so that instruction can be calibrated frequently, and self-assessment by students is an integral part of the program.

Professional Development Services Available

Teachers participate in a 10-day, 70-hour, on-site institute before teaching *FAST*. There are separate institutes for each of the three *FAST* courses. Each participant receives a full set of materials, including all teacher and student instructional guides. *FAST* provides preliminary outreach with school personnel and a commitment-building process that includes site visits and detailed implementation suggestions, supporting professional development and networking opportunities, follow-up coaching, and an implementation review process.

Evidence of Effectiveness

Numerous multi-state impact evaluation studies over the last ten years show *FAST* students to have significantly higher gains in manipulative laboratory skills and science achievement and better performance in basic thinking, problem-solving, and creative thinking. Evaluation findings are available at the Curriculum Research and Development Group Web site:
www.hawaii.edu/crdg/programs/science/fast/stdrpt.html.

Recognitions Received

In 2000, the U.S. Department of Education and the Expert Panel on Mathematics and Science designated *FAST* as an *exemplary* effective science program. The program has been similarly recognized by the Educational Testing Service as an exemplary program for serving minority and female populations, in *Crossing the Tracks* as an exemplary program in science for students in heterogeneously grouped classes, and in the *Consumer's Guide to Science Curriculum* as a science program appropriate for high-ability students. In addition, the *FAST* teacher institute has been recognized by the National Staff Development Council as an effective teacher-learning program for improving student learning. *FAST* has been identified by the U.S. Department of Education's Laboratory Network Program as meeting the national standards for science education.

Implementation Costs

FAST uses standard catalog supplies typically found in middle-school science laboratory/classrooms or equipment readily constructed by students and teachers. The effort to keep costs low makes the program workable even within the constraints of school science budgets. A small equipment building kit is required for *FAST* 1 and *FAST* 2. The program requires minimal laboratory facilities such as heat sources, running water, and laboratory bench space for students.

Contacts and Web Sites

Developer

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EarthComm

Grade Level



K 2 4 6 8 10 12 +

EarthComm: Earth System Science in the Community is a high school earth science curriculum developed by the American Geological Institute (AGI) and supported by the National Science Foundations and donors of the AGI Foundation. *EarthComm* emphasizes the relevance of earth science to students' own lives and environments. It includes five modules that can be taught in any order. Each module contains three chapters connected to a common theme that, when used together, constitute units.

Each chapter begins with a community-based problem or issue (a Chapter Challenge), which is the focus of the chapter activities, content, and final assessment. Activities involve primarily hands-on manipulation, interpretation, construction of maps, or directed use of designated Web sites. They are followed by related questions, problems, and exercises. The final chapter-challenge assessment asks students to tie together all they have learned throughout the activities.

Program Components

Each module chapter includes student print materials as well as teacher resources and assessment tools. Module titles include: Earth's Dynamic Geosphere, Understanding Your Environment, Earth's Fluid Spheres, Earth's Natural Resources, and Earth System Evolution. *EarthComm* Kits are available for the investigations and activities and include both durable and consumable items.

Professional Development Services Available

The American Geological Institute (AGI) hosts Annual Curriculum Leadership Institutes to build a network of educators and geoscientists to support the adoption and implementation of *EarthComm*. AGI also offers week-long professional development workshops each summer as well as one- and two-day workshops during the school year. The publisher, It's About Time, also provides professional development services for users of the IAS program, including introductory and implementation workshops, new-teacher and leadership institutes, and mentoring visits.

Contacts and Web Sites

Developer

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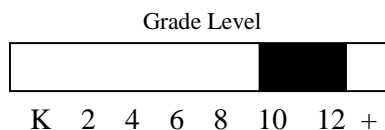
Publisher

It's About Time, 84 Business Park Drive, Armonk, NY 10504

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<http://www.its-about-time.com>

ChemDiscovery



ChemDiscovery is a full-year high school chemistry curriculum that uses Web-linked CD-ROM technology to provide an interactive learning environment for students and teachers with differing abilities, spheres of interest, and backgrounds. Instead of a textbook, *ChemDiscovery* is presented in a new educational format—a computerized, open-learning environment, with accompanying student and teacher materials.

ChemDiscovery consists of a series of eight projects, called Quests, which assist students in designing a virtual picture of the world on the computer from a chemical perspective. Students work in a highly interactive and free system, choosing a starting point for each particular Quest and constructing, together with a teacher, selective pathways through the learning environment. They may begin with the motivational and contextual tools Design of the Universe and Living in the Universe, which appeal to students interested in the environment and space. Students may also begin with the inquiry-based design activities, the laboratory experiments, or the text resources.

ChemDiscovery is well matched to the provisions and requirements of the National Science Education Standards. Its design approach begins with an overview that utilizes a series of questions to help students clarify their learning goals. As students work through the Quest they must work like a scientist, choosing materials, planning, designing, predicting the property of chemical species (nuclei, atoms, ions, molecules, chemical reactions, etc.), constructing them, evaluating predictions, and investigating properties and environmental impact. In this highly interactive design process students develop chemistry knowledge as well as inquiry, computing, and laboratory skills.

Program Components

The *ChemDiscovery* package includes a Student's Guide, a Teacher's Edition, a Laboratory Manual, and a Web-linked CD-ROM. The Student's Guide introduces students to each of the Quest activities and provides an overview and context. The Teacher's Edition presents an overview along with goals and key concepts for the Quest, suggested approaches, software guide, suggestions for fieldwork, and other support materials, including blackline masters. The CD-ROM materials include an overview of the Quest, and the related Activities, Resources, Databases, and Design Studio. The CD-ROM consists of: student activities, resources (an encyclopedia of chemical information), databases, computation labs (a chemical calculation tool), design studios (for designing virtual atoms, molecules, crystals, and chemical reactions), video labs (virtual experiments), an ecology field guide (environmental impact, virtual field trips), and an electronic journal (for students' thoughts, questions, and observations).

ChemDiscovery is a technology-based learning environment presented in Internet delivery format on a Web-linked CD-ROM.

Assessment Materials

Assessment in *ChemDiscovery* is a bridge between traditional and new pedagogies. Therefore, as it continually checks students' content understanding and problem-solving and laboratory skills, it also

includes new elements, such as monitoring student ability to work with original scientific data, modeling tools, and environmental resources. Each Quest includes relevant assessment strands drawn from the National Science Education Standards. The Teacher's Edition also provides assessment prompts for students, a scoring guide, assessment administration guidelines and an accommodations and modifications list.

Evidence of Effectiveness

Independent evaluation conducted in 20 U.S. beta and field test classrooms during the 1996–98 school years indicate that *ChemDiscovery*: is an innovative learning environment; is well-matched to the National Science Education Standards; and can dramatically change teachers' roles and students' interest levels and achievement.

Recognitions Received

The Colorado Commission on Higher Education recognized *ChemDiscovery* with a 1997 *Technology Excellence in Learning Award*. The program also received a *Best Practices in Education* designation in 1997.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

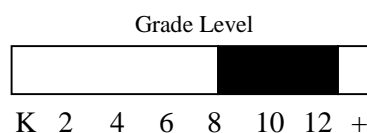
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ChemCom: Chemistry in the Community



Chemistry in the Community (ChemCom) is an introductory high school chemistry program organized as a single textbook containing eight thematic units. Each unit presents a different theme, identifies issues with societal and technological implications, and provides opportunities for students to understand the role chemistry plays in those issues. Each of the unit's sections addresses a different aspect of the overall theme and provides factual information about the chemistry concepts and how those concepts relate to the topic. Through their investigations of these issues, students make predictions, conduct experiments, draw conclusions, make inferences, discuss their ideas with other students, and justify their reasoning. The program incorporates reading, writing, and computational skills and integrates concepts from other disciplines.

Each unit is designed to be taught in 20 to 25 class periods. The developers recommend that the first four units be taught sequentially, but the remaining four units may be taught in any order. The eight units that comprise *ChemCom* are:

- Supplying Our Water Needs
- Conserving Chemical Resources
- Petroleum: To Burn? To Build?
- Understanding Food
- Nuclear Chemistry in Our World
- Living in a Sea of Air: Chemistry and the Atmosphere
- Personal Chemistry and Choices
- The Chemical Industry: Promise and Challenge.

The *ChemCom* pedagogical approach is to introduce concepts as they are needed to understand complex social and technological issues. A main goal of the program is to enhance scientific literacy by emphasizing how decisions about chemical use affect society. *ChemCom* topics focus on real-world issues to promote the understanding of chemistry as it relates to students' experiences. Instructional strategies emphasize social interactions, cooperative learning, and problem-solving.

Program Components

ChemCom curriculum materials consist of a Student Text and an accompanying Teacher's Guide. Each section in a unit includes some or all of the following components:

- Factual information about one aspect of the unit's theme
- Chem Quandary: brief descriptions of everyday experiences that combine chemical concepts with societal issues
- You Decide: description of a task or problem related to the section topic
- Putting It All Together: description of a more complex, hypothetical issue that provides opportunities for students to apply what they have learned in a slightly different context

- Laboratory Activities: topics-related investigations that make use of materials and reagents that can be purchased at grocery or hardware stores
- Extending Your Knowledge: optional, enrichment experiences that involve library searches, at-home labs, or other out-of-school investigations.

The Teachers' Guide provides guidelines and hints to facilitate implementation of lab activities, background information, a schedule to guide planning, blackline masters, unit tests, answer keys, and an outline of alignment to the National Science Education Standards. *ChemCom* Connections is a laser disc consisting of narrated video segments on topics that support the high school chemistry curriculum. Teachers who adopt *ChemCom* receive *Chemunity News*, a free quarterly newsletter. *ChemCom* also supports an e-mail list through which teachers can discuss common issues and concerns.

Assessment Materials

ChemCom addresses assessment in three main ways. Decision Making Activities provide opportunities for students to demonstrate their knowledge by applying what they have learned in hypothetical situations. In-text Questions consist primarily of short-answer or essay questions designed to review and reinforce skills and/or ideas. End-of-Unit Tests consist of multiple-choice and free-response questions.

Professional Development Services Available

The American Chemical Society supports teacher workshops that range from a half-day to five days, taught by practicing *ChemCom* teachers.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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<http://www.acs.org/education/curriculum/chemcom.html>

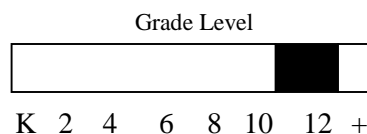
Publisher

Michael Saltzman, W. H. Freeman & Company, 4 B Cedarbrook Drive, Cranbury, NJ 08512

Phone: 866-843-3715; Fax: 609-409-0297; E-mail: msaltzman@bfpwpub.com

<http://www.whfreeman.com/chemcom>

Minds-On Physics (MOP)



Minds-On Physics (MOP) is a full-year high school physics course intended to prepare students for college-level science. It is contained in six booklets designed to be taught in sequence and each lasting a quarter of the school year. The Core Curriculum includes Motion, Interactions, and Conservation Laws and Concept-Based Problem Solving. The Supplemental Curriculum includes Fundamental Forces and Fields, Advanced Topics in Mechanics, and Complex Systems.

MOP emphasizes the development of fundamental physics concepts through activity series that encourage students first to explore and refine their own understandings of the concepts, then to engage in analyzing and reasoning about physical concepts, and finally to organize concepts and principles and use them to solve problems. The activities were selected and designed based on a large body of formal research on cognitive development and the learning of physics, much of it carried out by the developers themselves. *MOP* advocates what it calls an “action-oriented” approach to learning in which students, working in groups, use concepts to analyze problem situations and answer open-ended questions, explain the meaning of concepts through inquiry and hands-on activities, share personal reflections on related experiences, organize their knowledge by integrating new with prior learning, and establish the contexts and procedures for using the knowledge for problem solving.

Program Components

The first three volumes are designed to be taught approximately in sequence. The last three have a flexible order and are organized into groups of four to seven activities. Little or no reading or other preparation is required by students prior to working on an activity, and most activities require students to interact with each other. The end of each booklet includes a Student Reader, which summarizes the ideas raised in the activities in one to two pages per activity.

A Teacher’s Guide accompanies each booklet and contains blackline masters of handout worksheets to accompany each activity. Each Teacher’s Guide also provides instructional aids for each activity, as well as answers with brief explanations for all of the questions and problems in the activities.

Assessment Materials

Each of the activities has one or more associated student worksheets that form the main vehicles for assessment. The Teacher’s Guide provides between 8 to 18 “Probing for Student Understanding” questions, and the first booklet contains an addendum describing the importance of assessing student understanding as their learning grows and as a final evaluation.

Professional Development Services Available

The University of Massachusetts Physics Education Research Group conducts workshops and provides individual counseling via e-mail. The publisher offers on-site training for sizeable purchases.

Evidence of Effectiveness

See Gerace, W., *et al.*, *Minds-On Physics: Materials for Developing Concept-Based Problem-Solving Skills in Physics* (n.d.), or visit <http://umperg.physics.umass.edu/gemsFolder/umperg2/MOPNew.pdf>.

Implementation Costs

Each student volume of activities is \$15.99; each Teacher's Guide is \$36.99.

Contacts and Web Sites

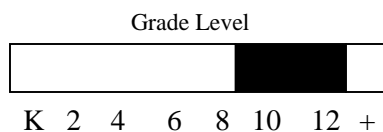
Developer

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<http://www.kendallhunt.com/elhi/mop.html>

Active Physics



Active Physics is an introductory, activity-based physics course organized into six thematic units. Each of the thematic units contains three chapters which, although all related to the theme, are quite independent of each other. The chapters in the units can be taught in any order, and sequenced with chapters from other units. Each chapter is designed to last about a month and contains an average of eight activities. The activities in each chapter build toward a “chapter challenge” project that is designed to have real-world application and appeal to teenagers. The six units are Communication, Home, Predictions, Sports, Medicine, and Transportation.

Each chapter’s activities are designed in a sequence that threads the science content from one activity to the next. Each activity is built around an inquiry learning cycle. Students first establish their prior knowledge about a particular topic or concept. Then they explore and experiment with a phenomenon through an activity designed to challenge or extend their knowledge. Upon completing the activity, students attempt to infer and express what they have learned, and then apply that knowledge to various questions and problems. During each of these steps in the learning cycle, students respond to questions and prompts in the text designed to keep them mentally engaged in the activity. They reflect on and process their experiences and generate their own understandings of the science content embedded within the activity. By the end of the chapter, students are expected to have enough information, skills, and understandings to appropriately respond to the Chapter Challenge. Chapter Challenges are designed to use cooperative groups of students and require a variety of student skills and abilities.

Program Components

There are four components to the *Active Physics* curriculum and Student Text for each unit; a Teacher’s Edition for each unit; videos to be used as part of each unit; and a CD-ROM of resource articles with references. There are also Teacher Videos for each chapter that demonstrate how to set up and conduct the activities. Each chapter of a unit begins with a description of its chapter challenge followed by an average of eight activities. Most of the activities, which are designed to be used in a sequence, involve hands-on manipulation or measurement using everyday materials or standard lab equipment. The Teacher’s Edition provides suggestions for instructional strategies and possible reactions students might have to the activities, questions, and problems. It lists all requirement materials and supplies for each activity, hints on lab set-ups and procedures, and projected time for each activity.

Assessment Materials

Active Physics provides a variety of assessments. Physics to Go, following each activity, lists questions and problems that are closely related to the chapter activities. The Chapter Challenges are culminating activities but also are meant to be assessments of student learning. The program provides extensive guidance on developing and implementing rubrics for assessing the Chapter Challenge projects. End-of-chapter problems and questions appear in the Student Text and are closely related to the chapter activities. End-of-chapter tests appear in the Teacher’s Edition and include multiple choice, true-or-false, matching, fill-in-the-blank, and/or short-answer questions.

Professional Development Services Available

Six professional development videos introduce each unit and take viewers step-by-step through each chapter and activity. Services include awareness presentations, regional 5-day summer institutes, implementation workshops throughout the school year, and various related workshops.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

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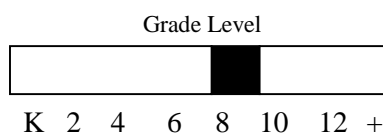
Publisher

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Introductory Physical Science (IPS)



More than three decades ago, *Introductory Physical Science (IPS)* was introduced as a pioneering curriculum for hands-on, inquiry-based, science. The seventh edition of *IPS* continues to be designed to offer an innovative, hands-on, and inquiry-based physical science curriculum. A limited number of topics are included in *IPS*, allowing students time and a variety of experiences needed to develop an understanding of the ideas. Students are guided through a central concept of physical science. This theme is the developmental evidence for an atomic model of matter. Rather than broadly surveying the entire field of physical science, *IPS* has taken a well-defined path toward this major objective. The method employed is one of experimentation and guided reasoning based on the results of student experiments.

IPS is a sequential course that can be divided into three parts. Chapters 1 through 6 provide the progression from mixtures to compounds and elements. In the process, students learn about the characteristic properties by which substances are recognized and separated. Chapters 7 through 9 introduce the atomic model through radioactivity. Chapters 10 through 12 add the electric dimension to the atomic model, reinforcing material learned in previous chapters.

The broad objectives of *IPS* include the development of laboratory skills, reasoning skills (such as the application of knowledge to new situations), and communication skills in the context of science, while providing an understanding of the foundations of physical science. *IPS* relies on all students having some experience with matter in their daily life, and therefore has no prerequisites in the areas of science content. In this program, all new ideas are based on concrete student experiences in the laboratory, and all new terms are introduced only after the need for them has been established. *IPS* teaches science through experiments designed with clear goals. As students perform and analyze experiments, useful new terms are introduced to help students describe their experimental results. Through active participation in reaching their own conclusions, students are given opportunities to achieve a deeper level of understanding.

Program Components

Components of the student textbook include: reading sections, experiments, problems and questions, RAEs (for Review, Applications, and Extensions), and themes for short essays. The comprehensive Teacher's Guide and Resource Book provides suggestions for each experiment, including schedules, equipment, technical hints, safety precautions, and sample data. Other main features include a foreword, a general overview and suggested schedule, and section and end-of-chapter questions.

The publisher, Science Curriculum, Inc., publishes a Diagnostic Software (Mac only) for the multiple-choice questions in the Assessment Package. In addition to the standard statistical analysis, the software provides a diagnostic statement for the most-often-used wrong answers and points out the mistakes. A student's form can be printed for parent and student conferences. Science Curriculum, Inc., makes a special student edition of the widely used graphing program KaleidaGraph. The student edition includes

the same routine for histograms that is used in the *IPS* textbook and provides preconfigured files for the *IPS* experiments, which is a great time-saver (Mac and PC on same CD).

Assessment Materials

The assessment package covers the entire course and is consistent with program objectives. There are two sets of 12 chapter tests, consisting of multiple-choice questions and essay questions. The sets differ in degree of difficulty. In the lab tests section, each test is divided into the following components: To the Student, Teacher's Notes, Sample Data, What to Look for in Students' Papers, an Apparatus and Equipment Themes for short essays are located throughout the text to encourage writing in the context of science. The cooperation of science and English teachers is recommended. Students' achievements can also be assessed by a variety of problems and questions found at the end of each chapter, using the RAEs. The assessment package includes chapter tests and lab tests that cover the entire course.

Professional Development Services Available

Science Curriculum, Inc., sets aside 5 percent of the purchase price of all copyrighted materials of the sixth and seventh editions sold to the purchasing school or school district. This credit is cumulative over three years and is designed to support attendance at an authorized *IPS* workshop. Two-week workshops have been offered at the Colorado School of Mines in Golden, Colorado. A local school district workshop can be arranged when sufficient numbers justify it.

Evidence of Effectiveness

The first edition and all the changes in the later editions have been thoroughly piloted. Thus, the ineffective parts were revised on the basis of the feedback from the pilot teachers. Although only anecdotal, the reports from senior high school science teachers (biology, chemistry and physics) attest to the substantial advantage that *IPS* students have due to their acquired laboratory and analytical skills.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

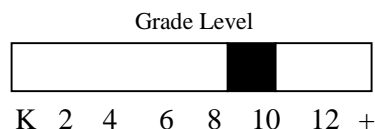
Developer

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Publisher

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Comprehensive Conceptual Curriculum for Physics (C³P)



Comprehensive Conceptual Curriculum for Physics (C³P) offers an integrated approach to physics content, instructional materials, and pedagogy. *C³P* is a research-based curriculum developed at the Department of Physics, University of Dallas. The project is available on a single CD-ROM that includes both the curriculum and resource materials. Other physics projects such as PRISMS, CASTLE, Operation Physics, Tools for Scientific Thinking, Physics: Cinema Classics, and The Mechanical Universe High School Adaptation have been used in the development of this curriculum. Although *C³P* was designed for students in grades 9 or 10, it contains an assortment of resources, making it flexible enough to accommodate a variety of teachers and students.

The goal of *C³P* is to produce and disseminate a comprehensive, conceptually based physics curriculum suitable for all high schools, usable by all teachers, and effective for all students. To meet this goal, the program:

- provides physics teachers with both materials and pedagogical approaches to enable them to teach a conceptual course in physics to all students
- recognizes students' prior experiences and knowledge as expressed by their preconceptions
- provides concrete experiences with phenomena, whenever possible, before introducing related terminology
- employs a learning cycle that guides students from concrete experiences and descriptive expressions to quantitative reasoning
- revisits concepts, principles, and theories in a spiral approach at successively higher levels of depth and abstraction
- connects the physics learned to everyday applications, history, and other disciplines
- reduces topical coverage with an increased emphasis on in-depth conceptual understanding
- incorporates assessment procedures and instruments aligned to the curriculum to measure student skills, knowledge, understanding, and reasoning
- incorporates technologies, including calculator-based labs (CBL) and simulations when appropriate.

C³P's integrated learning cycle approach is research-based and student-centered. It includes the following stages:

- **Exploration:** Students are involved in hands-on activities, model-building, computer simulations and group activities. Students use materials to acquire information and learn through their own questions and actions.
- **Concept Development:** Teacher-led discussions, interactive presentations, videos, and simulations help answer students' questions. Student understanding is promoted through focus, and concept language is developed.

- Application: Students are involved in real-life use of concepts, problem-solving, and decision-making connections to technologies. Students learn to accommodate new concepts into existing concepts.

Program Components

Student activities can be printed out from the CD-ROM. Extensive teacher notes and lesson plans are also provided.

Assessment Materials

The learning cycle approach provides teachers with opportunities for continual assessment of students' understanding. In addition, the program provides a variety of assessment tools including both traditional and alternative test items. Ready-to-print tests, featuring multiple-choice, matching, and/or short-answer questions, are available for each of the five physics topics. Teachers have access to the PRISMS test bank and selections from the Mechanical Universe test banks. Suggestions for alternative assessments, along with a scoring rubric for such items, are provided in the test directory. A variety of assessment tools includes portfolios, teacher observables, multiple-choice questions, and open-ended essays. The learning-cycle approach provides teachers with continual assessment of students' understanding. The Program provides pre- and post-assessment tests that are aligned with the curriculum.

Professional Development Services Available

The *C³P* CD-ROM is available only through workshops. The workshops consist of 45 to 60 contact hours and are offered by Program Mentor Teachers during the summer and occasionally during the school year. The workshops provide hands-on experience for high school teachers with new technological and pedagogical approaches to teaching physics. Teachers learn how to use calculator- and computer-based software for data acquisition and analysis, video analysis, and simulations. In addition, teachers gain knowledge with multimedia authoring and use of the *C³P* CD-ROM. Included in the course are practical exercises in developing lesson plans and assessments. Participants can earn three hours of semester credit. Mentor teachers provide ongoing support to teachers who have participated in their workshops. Support is offered through visits, telephone conferences, and e-mail. Check *C³P*'s Web site for a listing of upcoming workshops. In addition, the Program has a listserver through which anyone may address questions. Networking opportunities include a newsletter, e-mail, a listserver, and a Web site (<http://phys.udallas.edu>).

Implementation Costs

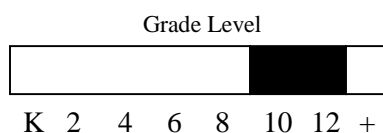
The cost of a summer workshop is approximately \$600, which includes, instruction, make-and-take materials, the CD-ROM, and room and board.

Contact and Web Site

Developer/Publisher

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<http://phys.udallas.edu>

Modeling Instruction in High School Physics



Modeling Instruction in High School Physics is grounded on the thesis that scientific activity is centered on modeling: the construction, validation, and application of conceptual models to understand and organize the physical world. The program uses computers and modeling methods to develop the content and pedagogical knowledge of high school physics teachers and cultivate them as leaders in science teaching reform and technology infusion in their schools and districts. The program relies heavily on professional development workshops to equip teachers with a teaching methodology. Teachers learn to develop student abilities to make sense of physical experience, understand scientific claims, articulate coherent opinions of their own, and evaluate evidence in support of justified belief. For example, students analyze systems using graphical models, mathematical models, and pictorial diagrams called system schema.

The program's goals are explicit and reflect current research on learning theory. The content embedded in the units is fundamental to physics and all science. The program utilizes experimental design, control of variables, and calls for reasoning and application of skills in solving problems. There is strong use of student discourse, as evidenced by the need for students to present and justify conclusions derived in the laboratory. Multiple strategies for problem-solving are encouraged, reflecting sensitivity to individual student differences and abilities. The program contains a rich, integral system of assessment, and the multiple modalities it employs provide teachers with ample entry points into the students' learning processes. Many aspects of the teaching methodology can be successfully transferred to other settings.

The program addresses the national content, teaching, and assessment standards, and it stresses modeling and the skills, attitudes, and values of scientific inquiry. It addresses important individual and societal needs by providing constructivist pedagogy for the fundamental mechanics that are crucial to understanding the physical world.

Program Components

The model-based curriculum for more than a year's course is freely downloadable by anyone at <http://modeling.asu.edu>. Participants at each workshop are given a password to download assessment instruments.

A CD-ROM of the entire year's curriculum and model-based "underpinnings" curriculum for middle school is freely available for duplication by teachers at all workshops.

Professional Development Services Available

High school physics teachers participate in one or more of a series of intensive workshops over two summers. Workshops are held each summer at Arizona State University in Tempe and at universities that volunteer nationwide. Most workshops are funded by statewide ESEA Title II Higher Education Program grants from the U.S. Department of Education. Workshops range in duration from one-week introductory

workshops, focusing on kinematics, to four-week workshops that thoroughly treat the pedagogy and content of an entire semester of mechanics (first summer) and waves and sound, electricity, and light (second summer). Participants are invited to subscribe to the modeling e-mail list for continuous professional development in *Modeling Instruction*.

Evidence of Effectiveness

Using the Force Concept Inventory (FCI), data collected on 24,000 students in courses of hundreds of high school, college, and university teachers indicate that students' naïve beliefs about motion and force are little changed when using traditional instructional methods, while much greater changes can be achieved with instructional methods derived from modeling. Repeated findings have demonstrated greater gains for program students in physics content knowledge when compared to physics students of the same teachers in the year before the teachers implemented the program and students in traditional physics classes. An 18-page report is available from the Web site listed below.

Recognitions Received

Modeling Instruction in High School Physics was recognized as an *exemplary* science program in 2001 and as a *promising* educational technology program in 2000 by the U.S. Department of Education.

Implementation Costs

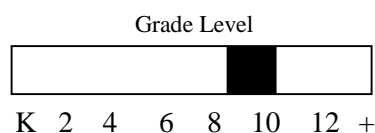
Curriculum is freely available to all. The minimal cost for an individual teacher to implement the mechanics modeling program includes tuition for a three- or four-week summer workshop, \$20 for instructional materials, and travel/room/meal expenses. For a group of school districts to implement the program for 24 physics teachers, minimal workshop costs include fees of \$1000 per week multiplied by two master teacher-leaders. Implementation of mechanics in the classroom is best accomplished with computers that have laboratory interface and three MBL probes: motion detector, pair of photogates, and force probe. One computer for every three students is recommended.

Contact and Web Site

Developer

Jane C. Jackson, Department of Physics and Astronomy, Box 871504, Arizona State University, Tempe, AZ 85287-1504
Phone: 480-965-8438; Fax: 480965-7331; E-mail: Jane.Jackson@asu.edu
<http://modeling.asu.edu>

Biology: A Community Context



Biology: A Community Context is an introductory high school biology program designed to reflect the view that an understanding of biology is a prerequisite for addressing environment problems and that learning is best achieved by hands-on involvement with materials. The program engages students in learning biology by focusing on real-world problems similar to those they might encounter in their everyday lives. The program consists of eight units that focus on ecology, evolution, physiology, and genetics. It revisits certain concepts, particularly those relating to ecology. The first three units and the last unit comprise a sequential core; the remaining four units are elective and can be taught in any order. The use of all eight units constitutes a full-year course, and titles include: Matter and Energy for Life; Ecosystems; Populations; Homeostasis: The Body in Balance; Inheritance; Behavior and the Nervous System; Biodiversity; and the Biosphere.

Each of the units begins with the presentation of a specific real-life problem or societal issue. The sequence of activities is designed to provide students with opportunities to develop conceptual understanding and process skills they can use to propose solutions to the initial problem. These skills include writing, verbal communication, questioning, designing experiments, and analyzing data. The units also provide opportunities to extend students' understanding through independent investigations related the activities of each unit. Each unit guides students through stages of guided inquiry and investigation, data analysis and presentation, self-assessment, and cooperative learning.

Program Components

The program includes a Teacher Guide and a Student Book. The Teacher Guide includes the goals and objectives of the curriculum and its intended instructional strategies, safety precautions, and ideas for supporting an inquiry-based classroom. For each unit, the Teacher Guide provides goals and objectives, describes any advance preparation needed, and lists student objectives and suggested resources. For every inquiry within the unit, the guide also provides background information, instructional notes and suggestions, possible answers to student analysis and investigative questions, and suggestions for homework. The Student Book provides factual information related to the unit's theme and science content. Additional components of the program include videos that set the stage for the real-life problem in each unit; a Student Resource Book with in-depth articles related to the unit's concepts and issues; and an Instructional Resource Book with key concepts, additional student activities, lists of resources and references, blackline masters, and assessment materials.

Assessment Materials

Assessment opportunities include student logs and self-checks as well as other student self-assessments. There are embedded assessments that require students to use their knowledge and skills, and scoring rubrics are provided. Additional rubrics are included in the Instructional Resource Book. Unit exams are provided in printed form in the Teacher Guide and in the MicroExam Test Generator software. These exams provide an assessment tool for determining what students have learned from the guided and

extended inquiries in each unit, and emphasize critical thinking, analysis, evaluation, and application of knowledge.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

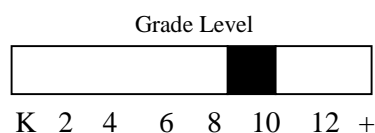
Developer

Dr. Barbara J. Speziale, G11C Tilman Hall, Clemson University, Clemson, SC 29634-0708
Phone: 864-656-1550; Fax: 864-656-7243; E-mail: bjspz@Clemson.edu

Publisher

Every Day Learning Corporation, P.O. Box 812960, Chicago, IL 60681
Phone: 800-382-7670; Fax: 312-540-5848; E-mail: elc_cs@mcgraw-hill.com
<http://www.sra4kids.com/everydaylearning/bcc/index.html>

BSCS Biology: A Human Approach



BSCS Biology: A Human Approach is a comprehensive introductory biology program for all students in grades 9 and 10. The program consists of six units designed to be used sequentially, with each unit divided into two or three chapters. *BSCS Biology: A Human Approach* primarily uses human examples as a vehicle for engaging students in the exploration of fundamental biological principles. The content is organized around unifying themes in biology, which include evolution, homeostasis, energy, matter, inheritance, and development. The materials support students' understanding of these themes by presenting concepts and factual content in ways that demonstrate the interconnectedness of the themes and by relating these concepts to the everyday lives of students. The program encourages development of higher-order thinking skills through hands-on learning emphasizing investigations, experimental design, analysis, and application of concepts. The curriculum encourages use of activities, authentic assessments, and a variety of instructional materials and strategies over texts, lectures, and traditional assessments.

BSCS Biology: A Human Approach emphasizes student-centered learning in which students are encouraged to master the processes of scientific inquiry. Instructional strategies promote independent learning and model real-life scientific endeavors through cooperative and collaborative means. The program is based on activities linked to extensive support readings. These readings are framed in real life and provide information that introduces, verifies, or extends information relating to the activity. Each chapter in the student text is organized around a learning cycle composed of five phases, the "BSCS 5 E's," which provide a structured and consistent format:

- "Engage" involves an activity that makes connections between past and present learning experiences and engages students in the concept to be explored. In chapter 2, "Evolution: Change Across Time," students read about the discovery of Lucy and consider how she might have bridged the gap between modern humans and early non-human primates.
- "Explore" provides a common experience within which students develop conceptual understanding. In chapter 2, students examine the relationship between biological and geological events by modeling the earth's history on a timeline.
- "Explain" allows students to use experience from the Explore phase to construct meaning. In chapter 2, students explain their understanding of evolution by writing an article about Darwin and his theory of natural selection.
- "Elaborate" challenges students to extend and apply their understanding and skills through new experiences. In chapter 2, students explore natural selection in a simulation and examine the cultural and biological evidence for evolution.
- "Evaluate": provides teachers and students with the opportunity to assess understanding of key concepts and skills.

Program Components

The *BSCS Biology: A Human Approach* program provides a Teacher's Guide, Teacher's Resource Book, a Student Book, video discs, and use of educational technology. Each Teacher's Guide includes overviews of the activities, materials lists, advance preparation information, strategies for guiding student

learning, assessment strategies, flowcharts for chapter implementation, uses of technology, and responses to procedural and analysis questions. The Teacher's Resource Book provides detailed strategies for implementing the program; a guide to assessment, including assessment instruments, correlation to the National Science Education Standards, copy masters, and optional activities. The student book contains activities that form the core of the program and essays that introduce, formalize, or elaborate concepts explored in the activities. The program also includes three interactive videodiscs that students use in activities. Educational technology is integrated into each unit and includes software, microcomputer-based laboratories, and simulations; a guide to the use of these activities is also included.

Assessment Materials

Assessment is an integral part of the *BSCS Biology: A Human Approach* curriculum and is embedded throughout. The assessment occurs in a variety of formats, including performance-based assessments, short answer and essay tests, presentations, written assignments, short- and long-term projects, portfolios, discussions, opportunities for individual and whole class self-assessment, and journals used to help students keep track of their own progress through the curriculum and allow teachers to assess work on an ongoing basis.

Professional Development Services Available

BSCS offers implementation support through the publisher, Kendall/Hunt, which ranges from half-day in-service workshops to week-long summer institutes. These are conducted by *BSCS* staff or Human Approach teachers who have been approved as trainers by *BSCS*. Kendall/Hunt offers an incentive program for defraying the cost of training. Although the week-long institutes are the best way to learn how to teach the program, any level of training is recommended. A Human Approach is unique, and even teachers familiar with reform-based pedagogy will benefit from a philosophical and conceptual overview of the program. Contact Kendall/Hunt's Training Coordinator at 800-258-5622 ext. 1064 for more information and schedules

Implementation Costs

Individual Student Books are \$49.99. The Teacher's Resource Book and Teacher's Guide are \$119 each. The video disc package is \$599.99, and each simulation is \$49.99.

Contacts and Web Sites

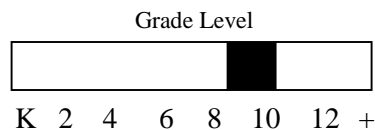
Developer

BSCS, Attn: Human Approach, 5414 Mark Dabling Blvd., Colorado Springs, CO 80918-3042
Phone: 719-531-5550; E-mail: highschool@bscs.org
<http://www.bscs.org>

Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002
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<http://www.kendallhunt.com/elhi/aha.html>

BSCS Biology: An Ecological Approach



BSCS Biology: An Ecological Approach, now in its ninth edition, is designed for first-year high school biology students. *BSCS*'s Green Version textbook integrates the major concepts of biology into an ecological framework. Embedded into the curriculum are ten fundamental themes: biological evolution, the diversity of life, genetic continuity, organism-environment interactions, the biological roots of behavior, the relationship between structure and function, homeostasis, science as inquiry, science and society and the history of biological concepts.

Using a student-centered, inquiry approach, Green Version offers students a rich array of hands-on activities and laboratories that develop inquiry skills and conceptual understanding. *BSCS* believes that students acquire and retain an in-depth understanding of biology when they are directly involved with the concepts and skills they are learning. Green Version emphasizes the process of discovery over the memorization of facts so that students don't just learn about science, they think science. Key features include:

- “Guideposts” that ask students interactive questions to begin the process of investigation
- “Pioneer” sections with brief vignettes about people, technology and ideas that parallel the topic under study
- “Biology Today” sections that explore topics of biological interest with important societal implications
- “Knowledge Check” questions that permit teachers to assess student understanding of major concepts
- Laboratory investigations and class projects that give students hands-on experiences
- Computer-based learning activities that include LEAP-System™ technology; two simulation labs that use computers
- Inquiry-oriented discussions that develop scientific thinking and communication skills.

Students learn biological concepts and content through direct involvement in collaborative, student-centered laboratory investigations that promote in-depth understanding and long-term retention. Investigations appear at the end of each chapter so that students can focus on the content within a chapter without distraction.

Program Components

- Student Text
- Teacher's Annotated Edition
- Teacher's Resource Book
- Computer test bank and Teacher's Guide
- Student Study Guide and Teacher's Annotated Edition
- Color transparencies

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

BSCS, Attn: Green Version, 5415 Mark Dabling Blvd., Colorado Springs, CO 80918-3842

E-mail: highschool@bscs.org

http://www.bscs.org/cp_hs_eco.html

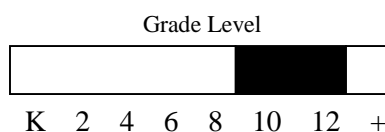
Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002

Phone: 800-228-0720; Fax: 563-589-1163; E-mail: mpriestm@kendallhunt.com

<http://www.kendallhunt.com/elhi/green.html>

BSCS Biology: A Molecular Approach



BSCS Biology: A Molecular Approach (BSCS Blue Version), now in its eighth edition, prepares honors or gifted students for the biology of the future by challenging them to think scientifically, integrate concepts, analyze data, and explore complex issues. Inquiry-based learning, a molecular perspective on the major concepts in biology and a focus on the nature and methods of science have been mainstays of the Blue Version since the first edition was released in 1963. The eighth edition incorporates new perspectives and understandings across major sub disciplines of biology such as genetics, cell biology, development, systematics, behavior, immunology, and evolution—the central organizing theme of biology.

As with *BSCS*'s other biology programs, the Blue Version provides an alternative to the presentation of vocabulary and isolated facts by using inquiry to present biology as an experimental science. Blue Version also recognizes the role that biology will play in the lives of students, who need an understanding of the possibilities and limitations of biological technology as they make decisions about everything from food products to medical care. By presenting science as a way of exploring the drama and beauty of the living world, students come to use scientific inquiry as a means to investigate the biological bases of problems in medicine, agriculture, and conservation, which will provide a context in which students can appreciate the relationship of biology to personal and societal issues.

Blue Version begins with a focus on the content of biology at the level of organization of molecules. The threads of molecular biology and the theory of evolution by natural selection tie together the chapters as the emphasis changes gradually from molecules to cells, individuals, populations, and, finally, the biosphere. Seven unifying principles serve as a framework for conceptual biology. Key features include:

- Inquiry-based learning, which allows students to learn science by doing science
- Laboratories and hands-on activities
- “Connections” sections that reinforce unifying biological themes
- “Theory boxes” that describe a theory that is important in the research and development of that area of biology
- “Word etymologies” that provide the meanings of words students encounter repeatedly
- “Chemistry tips” that give chemistry background information in the margins
- “Challenges” sections that link biological content to issues in research, public policy, discoveries, and careers
- “Web resources” that direct students to key sites on the Internet for further explanation and individual research.

Biological content is linked to seven major concepts: evolution; interactions and interdependence; genetic continuity and reproduction; growth, development and differentiation; energy, matter and organization; maintenance of a dynamic equilibrium; and science, technology and society. Students learn science by doing science, focusing both on the abilities and understandings of inquiry, the dominant instructional and learning theme in Blue Version.

Program Components

Teacher's materials include a Teacher's Annotated Edition; a Teacher's Resource Book (including supplementary topics, current literature, extended laboratory program); a Computer test bank; and an overhead transparency booklet.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

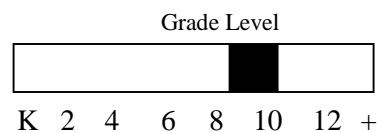
Developer

BSCS, Attn: Blue Version, 5415 Mark Dabling Blvd., Colorado Springs, CO 80918-3842
E-mail: highschool@bscs.org
http://www.bscs.org/cp_hs_mol.html

Publisher

Glencoe/McGraw-Hill, 8787 Orion Place, Columbus, OH 43240-4027
Phone: 800-848-1567
<http://www.glencoe.com>

Insights in Biology



Insights in Biology is an introductory biology course for grades 9 or 10 that intends to develop conceptual understanding through investigations of socially and personally significant issues. The program is organized into five thematic modules, each with a student manual and a supporting Teacher Guide. Each of the modules contains a “storyline” that encompasses the biology content, and the concepts introduced are connected within and among modules. The modules can be taught in any order, but the lessons within each module are intended to be taught sequentially. The modules require between 35 and 60 days to complete, with an average of 50 days per module.

Insights in Biology uses major biological concepts as a starting point and guides students in the development of conceptual understanding through applications of those concepts. The five modules and their concepts are:

- The Matter of Life: characteristics of life, energy and metabolism, homeostasis, and cell structure and function
- The Blueprints of Infection: immune system, pathogens, protein structure and function, DNA, replication, transcription, translation, disease, and disease prevention
- Different Stages through the Ages: reproduction, growth and development from fertilization to death, cells, tissues, organs, genetics, and speciation
- Traits and Fates: genetics and gene expression, meiosis, and sexual reproduction
- What on Earth?: ecosystems, ecology, population growth, and diversity.

Students follow a four-part learning sequence that starts with a Prologue that sets the stage for the unit’s Learning Experience (LE) by raising questions or making connections to knowledge gained in earlier lessons. Readings present biological concepts, often within historical or contemporary contexts. Each reading is followed by an analysis section, which poses questions that solicit inferences, opinions, or explanations for what students have read. Activities include laboratory investigations and small group projects related to the science content of the LE. Extending Ideas suggest projects, activities, or readings intended to broaden students’ understanding of the concepts developed in the LE, and On the Job describes careers related to the topics in the LE.

Program Components

There are three components to the *Insights in Biology* curriculum: a Teacher Guide for each module; a Student Manual for each module; and an Implementation Guide for the entire program. Each of the thematic units contains 7 to 15 Les. For each LE, structured so that new concepts build on prior experiences, the Teacher Guide includes an introduction with an overview, learning objectives, suggested time, materials and advance preparation, technology tools, teaching sequence preview, and points for further study. There is also a Teaching Sequence with a detailed teaching guide and the anticipated number of class periods required. An Implementation Guide provides teachers with an overview of *Insights in Biology*, explaining the goals and structure of the curriculum. The Student Manual contains the readings and activities students use in exploring the concepts in biology and in developing process and

critical thinking skills. It introduces concepts in biology, methods for exploring the concepts, and strategies for reaching new understandings. LE's include readings and activities that facilitate this process. Readings consist of materials from magazines, newspapers, books, and original writings. The activities include laboratory experimentation, role plays, simulations, model-building, and research projects. Extending Ideas provides opportunities for students to apply new understandings and skills to new situations so they may gain experience in independent research and in investigating issues outside of the classroom. Many of the suggestions involve other content areas or provide connections to other disciplines. This section also describes related career opportunities.

Assessment Materials

Many activities and assignments are designed to provide opportunities for teachers to assess students' understanding and alternative conceptions. The program provides assessment tools to be used prior to, within, and at the end of each module. The Teacher Guides include rubrics for all of the embedded assessments.

Implementation Costs

Contact the publisher for current pricing.

Contacts and Web Sites

Developer

Jacqueline S. Miller, Center for Science Education, Education Development Center, Inc., 55 Chapel Street, Newton, MA 02458-1060

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<http://www.edc.org/CSE/imd/insights1.html>

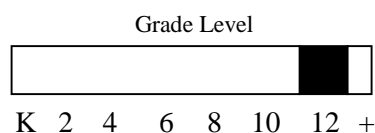
Publisher

Marie Priestman, Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, IA 52002

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<http://www.kendallhunt.com>

Science in a Technical World



Science in a Technical World is an interdisciplinary course with a focus on science applications in a variety of industries. The publishers recommend that the program be used as either a Tech Prep course or as a supplement to core high school science courses. The program is organized into 12 thematic units, each with a Student Book, video, and CD-ROM.

Science in a Technical World modules focus on the issues relevant to science-related industries. The industries serve as central themes for the development of science concepts. The 12 modules for the program include:

- Carbonated Beverages
- Polymer Research and Development
- Plant Tissue Culture
- Paint Research and Development
- Wastewater Treatment Plant
- Pulp and Paper
- The Drug Discovery Process
- Food Safety
- Petroleum Refining
- The Semiconductor Industry
- Medical Technology
- Criminal Forensics.

Science in a Technical World is designed to provide realistic problems that might be faced by technicians or other employees in science-related industries. Using this program, the classroom environment simulates the workplace. Students learn science content and process skills in the context of solving problems that might arise in industrial settings. Laboratory investigations, teamwork, and opportunities for oral and written communication are important features of the program.

Program Components

The four components of the *Science in a Technical World* curriculum are a soft-cover Student Book for each unit, a video tour of the industry for each unit, a CD-ROM for each unit, and a soft cover Teacher's Edition for the entire program. Each student book contains a challenge or problem associated with the unit's industrial theme. Units have sections as follows:

- Introduction presents the problem, identifies the student's role in solving the problem, and provides an industry overview.
- Technician Orientation identifies the concepts, information, processes, and skills students need to solve the unit's problems, then provides information and a sequence of laboratory experiences designed to promote understanding of the issues related to the problem.

- The Work sets an industry-related context for students to apply knowledge and skills gained in previous experiences through laboratory exercises and background information.
- Data and Results specifies a format for students to present their findings and offer solutions to the unit problem.

Assessment Materials

Science in a Technical World includes both formative and summative assessments. Thinking About questions in the Student Books prompt students to reflect on their laboratory experiences and make connections to science content and occupational skills. Other questions ask students to reflect on how they would explain information or describe techniques when training another person. For summative assessments, students present their solutions to the unit problems. After receiving feedback from the teacher and their peers, students are asked to reflect on their work. The CD-ROM also includes questions that assess students' knowledge.

Implementation Costs

The complete Teacher's Edition for units 1 through 6 and units 7 through 12 are available for \$54.90 each.

Contacts and Web Sites

Developer

American Chemical Society, 1155 16th Street, NW, Washington, DC 20036
Phone: 202-872-4600 or 800-227-5558
<http://www.acs.org/education/curriculum/sciteks.html>

Publisher

Michael Saltzman, Director of Sales, Bedford, Freeman & Worth Publishers, 4 B Cedarbrook Drive, Cranbury, NJ 08512
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<http://www.whfreeman.com/stw>

**New Jersey
Supplemental Programs**

SimCalc

Grade Level



K 2 4 6 8 10 12 +

The mission of the *SimCalc* Project is to enable all students, beginning with those who are least advantaged, to develop full understanding and practical skills in the fundamental concepts of the mathematics of change, including underlying concepts of calculus. The project strives to make the central ideas of calculus more accessible to all students by embedding them in the mathematics curriculum across grade levels. Funded by the NSF, the SimCalc project supports organizing curriculum around the long-term development of powerful mathematical ideas. The project illustrates how one such idea, the Mathematics of Change and Variation (MCV), can contextualize, enliven, and organize other important mathematics ideas that students are expected to learn and that many find difficult, such as signed numbers, areas of geometric figures, coordinate systems, decimal multiplication, slope, rate, ratio, and proportion. A combination of innovative curriculum and intelligent use of engaging technologies, such as simulations and visualization tools, make advanced topics like velocity and acceleration accessible to students—even before exposure to algebra.

Program Components

The software program MathWorlds for middle and high school grades is currently available for download on *SimCalc*'s Web site. This program displays animated worlds in which actors move according to graphs. Students can edit the graphs with the computer mouse, and during the edits, the graphs exhibit dynamic links that reveal mathematical relationships. For example, one of the MathWorlds is a simulation of two elevators whose movement is governed by the graphs displayed on the same screen. Using its link to Microcomputer Based Lab software, students can enter their own bodily motions, which will be displayed as the movement of a MathWorlds character, thus allowing the students to explore the mathematical properties of their own motions. Students can also use TERC's Line Becomes Motion apparatus in which a graph governs the motion of a physical device. MathWorlds has been used in middle school and in high school. *SimCalc* is creating new devices to enable students to explore unfamiliar mathematical systems in physical form. For example, TERC's Bouncing Cart enables students to explore a chaotic system and control the amplitude and frequency of the piston that drives the behavior.

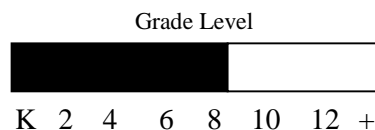
Contacts and Web Sites

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<http://www.simcalc.umassd.edu>

MARE: Marine Activities Resources & Education



Marine Activities Resources & Education (MARE) is an interdisciplinary whole-school immersion program that engages teachers, students, parents, administrators, and the community to transform K–8 schools into dynamic laboratories for the study of the ocean. The program was created in 1991 by the Lawrence Hall of Science at the University of California at Berkeley and has been successfully implemented in 250 inland and coastal schools. The curriculum is aligned with the New Jersey Core Curriculum Content Standards. The Lawrence Hall of Science and the Institute of Marine & Coastal Sciences (IMCS) at Rutgers University have formed a partnership to bring *MARE* to New Jersey schools.

The *MARE* curriculum associates each grade level with a different marine habitat. Crossing disciplines and linking subject areas, this curriculum helps students understand the overarching principles of science. Grades K–3 study shoreline habitats that are more familiar to younger students (K–1: rocky seashore; grade 2: sandy beaches; and grade 3: wetlands). Grades 4–5 study offshore habitats that are generally less familiar and represent more abstract processes (grade 4: kelp forest; grade 5: open ocean). Middle school students study habitats that are of global ecological significance (grade 6: islands, grade 7: coral reefs, and grade 8: polar seas). At each grade, the *MARE* habitat curriculum provides weeks of inquiry-based, hands-on activities. The activities include an integrated treatment of earth and physical science (substrates, properties of water, currents, and weather), environmental issues (pollution and habitat loss), mathematics, language, arts and literature, social studies, art, music, and drama.

IMCS has added an integrated set of Internet-based instructional modules to the *MARE* program. Developed for middle school students, these Internet-based activities capitalize on the research and technological assets of the Long-term Ecosystem Observatory @15 meters (LEO-15). LEO-15 is an undersea observatory off the coast of New Jersey used to collect data at temporal and spatial scales. These activities are designed to engage students in real-time science in a manner that helps them develop problem-solving and critical thinking skills that are essential to interpret, analyze, and communicate information.

Individual teachers at *MARE* schools use the thematic curriculum at their own pace throughout the year as a vehicle to coordinate and integrate their science instruction. Each school also devotes one part of the school year to an immersion-style event where the whole school can work together intensively. Known as Ocean Week (and Ocean Month in subsequent years), this event transforms an entire school into a laboratory for the discovery and exploration of the ocean.

Program Components

Student materials include the Rutgers Long-term Ecosystem Observatory CD-ROM, the Ocean Sciences in the COOLroom video, and the Marine Life poster. Teacher materials include a Teacher’s Guide to the Rocky Seashore (K–1); Sandy Beaches (Grade 2); Wetlands (3); Kelp Forest and a New Jersey *MARE* Guide to Shallow Bays (4); Open Ocean (5); Islands (6); Coral Reefs (7); and Polar Seas (8).

Interactive Web-based lessons using real-time data are available from the LEO site:
<http://marine.rutgers.edu/cousteau>.

Assessment Materials

MARE uses rubrics and alternative assessment strategies, which are included in the Teacher's Guide.

Other Language Versions

MARE is available in Spanish.

Professional Development Services Available

Each participating school is invited to send three to five educators (serving as a Leadership Team) to a week-long Summer Institute training program. Each Leadership Team member receives approximately \$450 in curricular and classroom materials. The Leadership Team is responsible for in-servicing the school staff and organizing an Ocean Week event. IMCS staff provides ongoing support and training for the Leadership Team throughout the school year in the form of one-day Habitat Workshops and Ocean Week Planning Workshops.

Evidence of Effectiveness

Results of an evaluation, which included a rubric assessment and focus groups, indicate the following of teachers polled: 85 percent say they are now using other non-textbook methods for teaching science, 55 percent say they see an increase in parental involvement, and 70 percent say their students have shown a greater interest in science all as a result of *MARE* (report available on request).

Recognitions Received

MARE was recognized as a Best Practice by the U.S. Department of Education's Regional Eisenhower Consortia.

Implementation Costs

Program costs are variable. Estimates are: Summer Institute: \$400 per educator; Inservice Programs and Consulting: \$475 per day; Ocean Week Programs: \$475 per day; and *MARE* Curriculum: \$40 per Guide.

Contacts and Web Sites

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Phone: 732-932-6555 ext. 521; Fax: 732 932-8578; E-Mail: mcdonnel@imcs.rutgers.edu

<http://marine.rutgers.edu/cousteau/education/mare.htm>

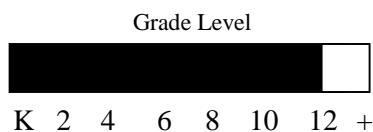
Developers

Catherine Haversen, Roberta Dean, and Craig Strang, Lawrence Hall of Science #5200, University of California, Berkeley, Berkeley, CA 94720-5200

Phone: 510-642-5132; E-mail: lhsinfo@uclink.berkeley.edu

<http://www.lhs.berkeley.edu/MARE>

CIESE Online Classroom Projects



The Center for Improved Engineering and Science Education (CIESE) at the Stevens Institute of Technology helps educators exploit the power of technology to improve instruction and bolster student achievement in mathematics and science. CIESE's mission is accomplished through a variety of activities including direct collaboration with teachers and school systems; partnerships with community colleges focusing on turnkey training, videoconferences, and hands-on workshops on the use of technology in science; and statewide projects linking other universities and institutions with schools across New Jersey.

Since 1995, CIESE has reached over 1,000 schools and 4,000 teachers and administrators in New Jersey. CIESE projects create and diffuse compelling, content-rich applications of telecommunications and the Internet in K–12 science and mathematics. Internet-based projects emphasize the following effective uses of the Internet:

- as a communications tool
- to collect real-time data/information
- to publish students' work
- to find unique and primary sources of information
- to participate in collaborative projects

Program Components

CIESE Internet-based mathematics and science curriculum projects are available at <http://www.k12science.org>. The CIESE Internet-based mathematics and science curriculum materials touch on a wide range of topics for K–12 students, such as earthquakes, navigation, properties of matter, and micro-invertebrates. Projects often include hands-on activities, worksheets, assessment materials, links to national and state standards, and suggestions for teachers on how to implement the projects in a range of classroom settings. Each project also contains a detailed teacher section that includes lesson plans, links to standards, and other useful suggestions for implementing the project.

Assessment Materials

Most online projects contain suggested assessment tools in the Teacher Area. These assessments include rubrics, worksheets, hands-on activities, and journal writing.

Other Language Versions

Spanish versions of several of CIESE's curriculum projects will be available in 2002.

Professional Development Services Available

The increased demand for high-quality professional development in the curricular applications of Internet-based resources in the K–12 science and mathematics classroom has prompted CIESE to expand its training program to all schools in New Jersey through two programs:

- The K–12 Partnership program: a 78-hour science-focused professional development series

- Technology in Mathematics Education (TIME) program: a 42-hour, hands-on focused professional development series focusing on mathematics topics for grades 5–10.

For a fee, schools can send teachers to a series of workshops focusing on standards-based curriculum materials that effectively incorporate the use of technology to increase student achievement.

Evidence of Effectiveness

Assessments of CIESE training programs indicate a correlation between teacher professional development and increased student achievement. For copies of evaluation reports, please contact CIESE directly.

Recognitions Received

The CIESE Web site and projects have received recognition from AAAS, NSTA, the U.S. Department of Education, and the Eisenhower National Clearinghouse, among others. Please visit <http://www.k12science.org/awards.html> for a complete listing.

Implementation Costs

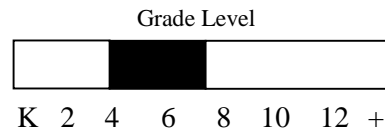
Use of the online projects is free of charge and open to the public. Teachers from around the world have accessed and used the materials. Contact CIESE for information about prices for professional development programs.

Contact and Web Site

Developer

Ms. Ronit Ehrlich, CIESE, Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030
Phone: 201-216-8066; Fax: 201-216-8069; E-mail: rehlich@stevens-tech.edu
<http://www.k12science.org/currichome.html>

Family Tools and Technology



The *Family Tools and Technology* (FTT) program is a national award-winning after-school program that focuses on technological design, problem-solving, and the integration of mathematics and scientific principles. Design and problem-solving activities in *FTT* are especially appropriate for both girls and boys (grades 4–7) and their parents or guardians.

Qualified *FTT* teachers involve family teams at their local school in a variety of exciting design challenges. Each of the seven *FTT* school sessions allows families to investigate, explore, problem-solve and gain an understanding of how our human-designed world works. *FTT* presents situations that spark curiosity and creativity, causing family teams to pose questions and then become engaged in discovering answers to those questions. By linking theory with practice and providing instruction on the design process, *FTT* helps students build confidence in their ability to create solutions to real problems.

FTT offers design challenges in pre-engineering, architecture and physical science. Teams may design and construct a communication device, create and test a structure, or design a control system for an amusement park ride using hand tools, simple machines, or commercially available construction kits. Families have fun and gain an understanding of how things work, acquire confidence in safely using tools and equipment, learn to think critically, and increase their confidence in solving technological problems.

Special features of the program include:

- activities that are aligned with the New Jersey Core Curriculum Content Standards in Mathematics and Science as well as national standards for technological literacy
- a professional development program endorsed by both the New Jersey Education Association Professional Development Institute and the New Jersey Statewide Systemic Initiative (NJ SSI).

Program goals include: 1) facilitating family involvement in authentic problems involving technological design, problem solving, and the application of mathematics and scientific principles; 2) increasing the number of students, both girls and boys, who are interested in technological design, engineering, and physical science; 3) stimulating parents to become advocates for their children’s problem-solving endeavors in technological design, engineering, and physical science; and 4) introducing students to the many career opportunities available in these areas.

Program Components

Student materials include written design challenges complete with needed resources and bibliography in English and Spanish. The Teacher’s Resource Guide is a comprehensive compilation of *FTT* activities and strategies for initiating and conducting *FTT* school sessions. The guide is available only to participants who complete the four-day *FTT* Professional Development Institute.

In addition to the Way Things Work CD-ROM and the LEGO Dacta Technic Construction Kit, there is an *FTT* Toolbox, complete with hand tools and selected other materials.

Other Language Versions

The *FTT* Teacher's Resource Guide is available in Spanish.

Professional Development Services Available

Teams of two teachers participate in a four-day Professional Development Institute to implement *FTT* successfully at their schools. The Institute includes the Toolbox, LEGO Dacta Technic Construction Kit, and the Way Things Work CD-ROM. *FTT* Professional Development Institutes will be held in June and August 2002.

Evidence of Effectiveness

As one teacher/facilitator said, "*FTT* shows girls and minorities that they have as much ability and the same opportunity in professions known typically as 'for white males only.'" An independent evaluator in 1996–97 found that *FTT*: 1) reduces gender stereotypes—particularly boys' stereotypes—about girls who use tools and about women and men; 2) improves student attitudes towards tools, as well as towards those who use them, with a particular emphasis on improving boys' attitudes towards girls who use tools; and 3) appears to have an impact on the number and type of tools students use.

Recognitions Received

In July 2000, the U.S. Department of Education recognized the *FTT* program as a *promising* Gender Equity Program.

Implementation Costs

Costs vary depending on the challenge activities presented during the seven *FTT* school sessions. Budget items to be considered include:

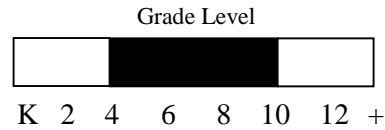
- The *FTT* Professional Development Institute registration: \$1,600 for a team of two teachers
- A stipend for two teachers to plan and present the seven *FTT* sessions
- Expendable materials (approximately \$25 per family team)
- Meeting refreshments
- LEGO Dacta Technic Construction Kits (one per family at \$100 per reusable set).

Contact and Web Site

Developer

Dr. Robert D. Weber, NJ SSI, The College of New Jersey, Department of Technological Studies,
P.O. Box 7718, Ewing, NJ 08628
Phone: 609-771-3384; Fax: 609-637-5148; E-mail: rweber@tcnj.edu
www.tcnj.edu/~njssi

(RST)²: Revitalizing Science Teaching Using Remote Sensing Technology



In the *Revitalizing Science Teaching Using Remote Sensing Technology* (RST)² project, teachers develop an interactive relationship with their students by involving them in meaningful scientific inquiries. The program utilizes Geographic Information Systems (GIS), real-time GOES-GVAR satellite images on the Internet, and data collection to support the curriculum. Teachers attend a three-week Summer Institute at Ramapo College, where they gain increased knowledge of environmental and earth science, geography, meteorology, global processes, technology, inquiry-based cooperative learning, and evaluation and assessment strategies.

Watershed students (grades 6–10):

- study their watersheds using the same GIS, satellite images, and databases as the New Jersey Department of Environmental Protection (software used: ArcView)
- measure and record environmental conditions and share data on an interactive watershed map
- use technology and problem-based approaches in earth, life, and environmental sciences
- share their results with scientists and the environmental community.

Meteorology students (grades 4–7):

- access and enhance real-time satellite images from the Ramapo College ground station via the (RST)² Web site (software used: ENVI)
- measure and record meteorological conditions, share data, create weather maps, and collaborate on cross-school projects using the (RST)² Web site
- use the technology and problem-based approach to study global environmental issues, geography, and social studies.

Other Language Versions

Meteorology is being translated into Spanish.

Implementation Costs

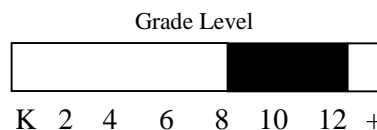
Either (1) Tuition for four graduate credits (see <http://www.ramapo.edu>), or (2) Instructional fee paid by school district at \$1,200 per teacher.

Contact and Web Site

Developer

Angela Cristini, Ph.D., Ramapo College of New Jersey, Mahwah, NJ 07430
Phone: 201-684-7724; Fax: 201-684-7977; Email: acristin@ramapo.edu
<http://www.rst2.edu>

Targeted Investigations in Environmental Science (TIES)



Targeted Investigations in Environmental Science (TIES) enables science and social science teachers to integrate science and use technology to elucidate interdisciplinary links. The *TIES* project examines humankind's use and disposal of chemicals, including the impact of decision making on the environment and health. These issues center on connections among scientific content, concepts of data analysis, sociological concerns, economic considerations, and political perspectives.

The project will produce a combination of Web-based instructional materials and CDs for educators. An extensive field test with 225 teachers (75 per year) in urban, suburban and rural communities in New Jersey and New York will be conducted at *TIES*'s online and on-site Institutes. The outcome will be a professional development package for nationwide distribution. Project evaluation will be based on the acquisition of knowledge, infusion of technology, and shift to an interdisciplinary instructional approach by the teachers or participants.

TIES utilizes primary data from the federal Environmental Protection Agency; predictive modeling using Geographical Information Systems (GIS); functional use of the Internet; student-collected environmental data; research in science education; and (real-life) problem-solving through GIS. Chemicals targeted by *TIES* include lead, mercury, radon, PCBs, reducing air pollutants (such as sulfur), oxidizing air pollutants (nitrogen, ozone), asbestos, and DDT.

Professional Development Services Available

The Summer 2002 online institute will be held July 1–28; on-site institutes in New York and at two locations in New Jersey will be held July 29–August 9.

Evidence of Effectiveness

In the second year of beta testing, 30 to 40 schools are using *TIES*.

Implementation Costs

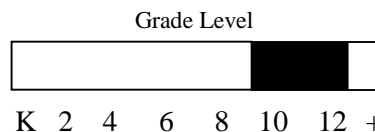
A stipend of \$1,200 is offered to participants in 2002.

Contact and Web Site

Developer

Angela Cristini, Ph.D., Ramapo College of New Jersey, Mahwah, NJ 07430
Phone: 201-684-7724; Fax: 201-684-7977; E-mail: acristin@ramapo.edu
<http://www.rst2.edu/ties>

Waksman Student Research Initiative



The Waksman Student Research Initiative, based at Rutgers University, offers a number of projects to support high school science instruction.

Project: Waksman Student Scholars Program

Since 1993, the Waksman Student Scholars Program has provided avenues for teams of high school science students and their teachers to participate in research in molecular biology and bioinformatics. Teams (a teacher and two students) learn about genetic engineering, genomics, molecular biology, and bioinformatics by working on a research problem in these fields. This year-long program begins with a four-week summer Institute, continues during the academic year at each participating high school, and concludes the following spring with the Waksman Forum Poster Session (selected presentations will be submitted for publication). High school teachers may earn three graduate credits during the Institute and students may enroll in the associated Rutgers University course, Introduction to Research in Molecular Biology and earn three college credits (partial scholarships are awarded).

Implementation Costs

Most materials and supplies are provided (not including high-cost equipment). Teacher stipends and student stipends are awarded for participation in summer Institute.

Project: Waksman Challenge

The Waksman Challenge is a research project in molecular biology and bioinformatics that teams of high school students can pursue using Internet resources. Scientists from Rutgers University and Amersham Pharmacia Biotech, Inc., devise four research problems during the academic year. Each solution requires students to access molecular databases and similar resources on the Internet. Responses are evaluated and a constructive critique is sent to each team. Each student participant receives a certificate acknowledging his or her contributions. Outstanding responses are awarded special recognition.

Implementation Costs

This is a free program.

Project: Genes, Genomes, and Human Genetics

Genes, Genomes, and Human Genetics is a one-semester, online research course that teaches the fundamentals of molecular genetics, biotechnology, and modern genetics. It is designed primarily for pre-college students, but others are encouraged to enroll. A major feature of the course is that students are

required to carry out a research project using Internet resources. The course will be field-tested during the fall 2001 semester. Students can enroll and earn three units of college credit from Rutgers University.

Implementation Costs

Rutgers University tuition and fees (for a three-credit course) are still to be determined.

Project: *Rutgers Research Colloquia Series in Molecular Biology*

The Rutgers Research Colloquia Series in Molecular Biology is designed to bridge the gap between the scientific research community and the public through the schools. It encourages science educators to identify their efforts with those of the scientific community.

During the academic year, a series of four evening science seminars for high school teachers are presented by Rutgers research scientists. Each program includes a science seminar and an informal, interview session, followed by dinner. For selected sessions, an activity handout for use with high school students is available. PowerPoint slides used by presenters are posted following each seminar. Please refer to <http://lifesci.rutgers.edu/~neigeborn/showcase> for materials from the 2000–2001 academic year.

Certificates crediting New Jersey teachers towards their 100 hours of continuing professional development are distributed at the end of each seminar.

Implementation Costs

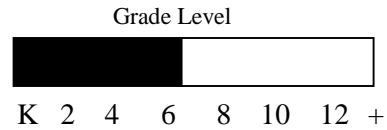
The \$10 registration fee is returned upon sign-in.

Contact and Web Site

Susan Coletta, Senior Science Education Specialist, Waksman Institute, Rutgers University
190 Frelinghuysen Road, Piscataway, NJ 08854-8020
Phone: 732-445-2038; Fax: 732-445-5735; Voicemail: 732-445-3531; E-mail:
coletta@waksman.rutgers.edu
<http://morgan.rutgers.edu>

**Sources of
Implementation Support**

The ARC Center



The ARC (Alternatives for Rebuilding Curricula) Center is funded by the NSF to promote the wide-scale and effective implementation of standards-based elementary mathematics curricula. The ARC Center is a collaborative effort of the Consortium for Mathematics and its Applications (COMAP) and three NSF-funded elementary mathematics curriculum programs:

- *Investigations in Number, Data, and Space*, developed by TERC, Cambridge, MA
- *Everyday Mathematics*, developed at the University of Chicago
- *Math Trailblazers*, developed at the University of Illinois at Chicago.

The ARC Center offers a variety of services to support curriculum selection and implementation. These include: 1) distribution of information about the curricula mentioned above; 2) consultation on long-term planning, including the design of pilot tests and staff development programs; 3) assistance with proposal development; 4) leadership institutes for each of the three curricula; and 5) presentations at local, regional, and national meetings and conferences.

ARC Center staff are available by phone, e-mail, or on the Web at www.arcenter.comap.com. Additionally, educators and others can visit the ARC Center curriculum library to survey materials, view classroom videotapes, read relevant articles and information, or discuss implementation issues with ARC Center staff.

Contact and Web Site

The ARC Center, COMAP, Inc., 57 Bedford Street, Suite 210, Lexington, MA 02420
Phone: 800-772-6627 ext. 50; Fax: 781-863-1202; E-mail: arcenter@mail.comap.com
<http://www.arcenter.comap.com>

Show-Me Center

Grade Level



K 2 4 6 8 10 12 +

The Show-Me Project is a partnership of the University of Missouri and five NSF-sponsored curriculum development projects and their publishers. The project provides information and resources to support selection and implementation of standards-based middle-grades mathematics curricula. The five projects are: *Connected Mathematics*, *Mathematics in Context*, *MathScape*, *Middle Grades Math Thematics*, and *Pathways to Algebra and Geometry*.

The primary goals of the Show-Me Project are to:

- disseminate information about and support awareness and implementation of comprehensive standards-based middle school mathematics curricula
- design and deliver professional development experiences for middle-grade teachers, administrators, and other key personnel committed to improving middle school mathematics programs through standards-based curricular and instructional innovation
- collect, organize, and disseminate information regarding the impact on student learning of standards-based middle-grades mathematics curricula.

Professional Development Services Available

The Show-Me Center organizes and facilitates an annual conference where all of the partner curriculum projects (satellites) are showcased. Each Satellite Center sponsors summer institutes for new and experienced users of their programs. Project staff members provide presentations on demand and introduce teachers and administrators to the NSF standards-based curricula. A list of upcoming workshops can be found on the Show-Me Center Web site (see the Conference feature). The Web site also highlights implementation stories, a list of publications related to curriculum reform, and provides a curriculum showcase for reviewing student and teacher pages from the curricula.

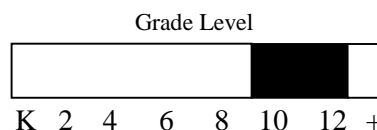
Contact and Web Site

Barbara Reys, Show-Me Center, University of Missouri, 303 Townsend Hall, Columbia, MO 65211

Phone: 573-884-2099; Fax: 573-882-4481; E-mail: center@showme.missouri.edu

<http://www.showmecenter.missouri.edu>

COMPASS



Curricular Options in Mathematics Programs for All Secondary Students (COMPASS) is a secondary school implementation project funded in part by the NSF. The project focuses on five high school mathematics curriculum development projects that support the NCTM Standards: *Interactive Mathematics Program*; *Contemporary Mathematics in Context*; *Mathematics: Modeling Our World*; *MATH Connections*; and *SIMMS Integrated Mathematics*. Each of these programs has undergone intensive curriculum development, revision, field-testing, and evaluation. COMPASS is comprised of six sites across the country: a central site at Ithaca College and satellite sites near each of the curriculum development locations.

The primary function of the central site is to inform schools, districts, teachers, parents, administrators, state offices, and other groups about these innovative curricula, assist in the first general phases of implementation (including curriculum selection), provide consultant services, and coordinate additional assistance from the satellite sites. Each satellite site provides information about its curriculum as well as professional development opportunities and other implementation strategies for schools interested in adopting its curriculum.

Professional Development Services Available

The COMPASS central site offers one- to three-day regional workshops on selecting and implementing standards-based high school programs. The satellite sites provide curriculum-specific professional development services, including workshops and electronic mailing lists.

Implementation Costs

School districts or other constituencies are expected to provide travel expenses (airfare, hotel, and meals) when an on-site visit seems appropriate.

Contacts and Web Site

Eric Robinson, Margaret Robinson, and John Maceli, COMPASS, 306 Williams Hall, Ithaca College, Ithaca, NY 14850

Phone: 800-688-1829; Fax: 607-274-3054; E-mail: compass@ithaca.edu

<http://www.ithaca.edu/compass>

The K–12 Mathematics Curriculum Center

Grade Level



The K–12 Mathematics Curriculum Center (MCC) was established in 1997 at the Education Development Center, Inc., with funding from the NSF. Its mission is to support school districts as they build an effective mathematics education program using curriculum materials developed in response to the National Council of Teachers of Mathematics’s Curriculum and Evaluation Standards for School Mathematics. The K–12 MCC serves school districts throughout the United States that are interested in mathematics curriculum programs consistent with the Standards.

The 13 programs supported by the K–12 MCC are:

- for elementary students: *Everyday Mathematics* (K–6), *Investigations in Number, Data, and Space* (K–5), *Math Trailblazers* (K–5)
- for middle school students: *Connected Mathematics* (6–8), *Mathematics in Context* (5–8), *MathScape* (6–8); *Middle Grades Math Thematics* (6–8), *Pathways to Algebra and Geometry* (6–7 or 7–8)
- for high school students: *Contemporary Mathematics in Context* (9–12), *Interactive Mathematics Program* (9–12), *MATH Connections: A Secondary Mathematics Core Curriculum* (9–11), *Mathematics: Modeling Our World* (9–12), *SIMMS Integrated Mathematics* (9–12).

Professional Development Services Available

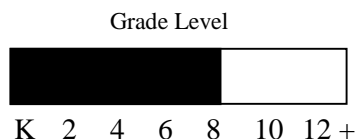
The K–12 MCC provides technical assistance through telephone consultations and referrals to materials and other service providers for teachers, administrators, and district staff. The Center supports districts around the country through:

- a series of 3-day seminars focused on selection, implementation (building support, professional development), and assessment
- print materials that supply information and guidance about curriculum selection and explain current issues in mathematics education. For example, *Curriculum Summaries* of the 13 programs provides key information at a glance. *Choosing a Standards-based Mathematics Curriculum* describes the selection process and suggests strategies for successful selection and implementation.
- technical assistance via telephone and e-mail.

Contact and Web Site

Amy Sennett, K–12 Mathematics Curriculum Center, Education Development Center, Inc.,
55 Chapel Street, Newton, MA 02458-1060
Phone: 800-332-2429; Fax: 617-969-1527; E-mail: mcc@edc.org
<http://www.edc.org/mcc>

Leadership and Assistance for Science Education Reform (LASER)



A project of the National Science Resources Center (NSRC), the Leadership and Assistance for Science Education Reform (LASER) Center disseminates high-quality, NSF-supported K–8 science curriculum materials that are aligned with national and state standards to more than 300 school districts. These districts represent eight geographically diverse U.S. regions, serving approximately one million K–8 students, and employing more than 27,000 teachers. The initiative is based on a collaborative model for catalyzing and sustaining science education reform at the regional level.

To accomplish its science education reform goal, the NSRC has formed partnerships with eight regional sites, publishers of NSF-supported middle and elementary school curriculum materials, and several major corporations and private foundations. Together with the NSRC, the LASER partners offer a comprehensive menu of programs, products, and services to school districts initiating and implementing inquiry-centered science curriculum programs for all their K–8 students. The states represented include Alabama, California, Connecticut, New Jersey, Oklahoma, Pennsylvania, Rhode Island, South Carolina, and Washington. Each site is comprised of a unique coalition of institutions that include academic institutions, corporations, museums, state departments of education, NSF Systemic Initiative projects, and other organizations working on K–8 science education reform.

Several publishers work in partnership with the NSRC, the eight LASER regional sites, and the school districts to implement *Full Option Science System* (K–8); *Insights* (K–6); *Science and Technology for Children* (1–6) and *Science and Technology Concepts for Middle Schools* (6–8); and *Science Education for Public Understanding Project* (6–8). The publishers’ support includes the provision of workshop leaders and sample sets of curriculum materials for LASER events, copies of related marketing materials for distribution to LASER client school districts, and financial support for the overall LASER initiative.

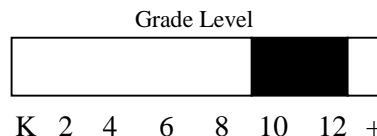
Professional Development Services Available

Professional development services include Developing a New Vision of K–8 Science Teaching and Learning Conference, LASER K–8 Science Education Strategic Planning Institute, Science Education Curriculum Showcase, Principals’ Symposium, Advanced Implementation Conference, Networking Forum, and regional technical assistance programs.

Contact and Web Site

Evelyn M. Ernst, Director, The LASER Center, National Science Resources Center, 955 L’Enfant Plaza, SW, Suite 8400, Washington, DC 20024
Phone: 202-287-7247; Fax 202-287-2070; E-mail: nsrcoutreach@nas.edu
<http://www.si.edu/nsrc/laser/laser.htm>

The SCI Center at BSCS



The SCI (Science Curriculum Implementation) Center at BSCS (Biological Sciences Curriculum Study) is part of a national reform initiative that focuses on building the leadership capacity for sustainable implementation of standards-based, inquiry-oriented instructional materials in science education. BSCS established the SCI Center with funding from the NSF. The mission of The SCI Center at BSCS is to assist district- and school-based leadership teams as they build and implement effective high school science education programs that feature reform-oriented instructional materials. These materials have the potential to transform teacher thinking and practice and to change the culture of schools by helping them become professional learning communities. The process of implementation includes:

- developing an *awareness* of inquiry-oriented instructional materials that align with the National Science Education Standards
- the *selection* of instructional materials, which includes evaluating how they align with standards, designing criteria for selection, completing an evidence-based screening process that leads to piloting, and making a decision based on the pilot results
- the *adoption* of materials, where district leaders focus on designing professional development opportunities to support teachers' use of new instructional materials. Adoption includes building a professional development infrastructure that integrates the knowledge and beliefs of teachers, research on how students learn science, and the resources provided in the instructional materials.
- analyzing the *impact* of curriculum implementation on students, teachers, and the school community. One way of informing instruction and assessing the curriculum's impact on student learning is to have teachers collaboratively examine student work.

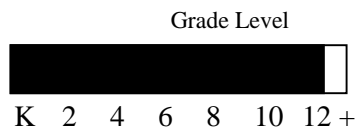
Professional Development Services Available

For districts committed to high school science reform, The SCI Center at BSCS offers a three-year National Academy for Curriculum Leadership. Leadership teams progress through the key stages of selection, adoption, and impact as they implement NSF-funded instructional materials. The SCI Center also offers seminars on evaluating and selecting standards-based instructional materials and on designing professional development for curriculum implementation. It has published a 2001 edition of *Profiles in Science—A Guide to NSF-Funded High School Instructional Materials*, which is also available on its Web site.

Contacts and Web Site

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<http://www.scicenteratbscs.org>

EDC K–12 Science Curriculum Dissemination Center



The EDC (Education Development Center) K–12 Science Curriculum Dissemination Center is a network of regional sites, or “hubs,” designed to introduce school districts to exemplary elementary, middle school, and high school science instructional materials. The Center targets school districts that have had limited exposure to exemplary, research-based instructional materials and/or little experience with national science education reform efforts. The components of the Center—seminars, follow-up support, and access to resources—are part of a comprehensive program that supports districts in examining instructional materials for grades K–12. With a focus on inquiry-based education, the Center provides participants with a unique opportunity to:

- examine their science programs across grades K–6, 6–8, and 9–12
- explore and critically assess exemplary science instructional materials
- select standards-based instructional materials most appropriate to their districts’ or schools’ context
- establish first steps toward adopting and implementing these instructional materials
- consider and plan for issues related to the long-term challenges associated with the selection and implementation of these instructional materials
- address questions related to their state standards and local science curriculum frameworks in order to connect science to the major learning goals of the district
- learn about the benefits associated with adoption and implementation of research-based science instructional materials and their relation to students’ science performance.

Contacts and Web Site

Judith Opert Sandler, and Barbara Brauner Berns, EDC, 55 Chapel Street, Newton, MA 02458

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Jsandler@edc.org; Barbara Brauner Berns: bberns@edc.org

<http://www.edc.org/CSE>

AAAS Project 2061

Grade Level



K 2 4 6 8 10 12 +

Project 2061 of the American Association for the Advancement of Science (AAAS) is a nationwide reform effort aimed at helping educators to improve teaching and learning so that all high school graduates are literate in science, mathematics and technology.

Program Components

Teacher materials include (*also available online):

- *Science for All Americans** (1989, Oxford University Press [OUP]), \$14.95
- *Benchmarks for Science Literacy** (1993, OUP), \$26.50
- *Resources for Science Literacy: Professional Development with CD-ROM* (1997, OUP), \$49.95
- *Blueprints for Reform** (1998, OUP), \$17.95
- *Dialogue on Early Childhood Science, Mathematics, and Technology Education** CD-ROM (1999, AAAS), \$12.95
- *Middle Grades Mathematics Textbooks: A Benchmarks-Based Evaluation with CD-ROM* (2000, AAAS), \$89.00
- *Middle Grades Science Textbooks: A Benchmarks-Based Evaluation* (to be published online)
- *Designs for Science Literacy with CD-ROM* (2001, OUP), \$49.95
- *Atlas of Science Literacy* (2001, AAAS), \$49.95
- *Algebra Textbooks: A Standards-Based Evaluation* (available online at www.project2061.org/tools/textbook/algebra)
- *High School Biology Textbooks: A Benchmarks-Based Evaluation* (to be published online).
- Proceedings of the AAAS Technology Education Research Conference* (see <http://www.project2061.org/technology>)
- *2061 Today* newsletter* (see <http://www.project2061.org/newsletter>)
- *Update 2001-2002** (see <http://www.project2061.org/newsletter>)

Other Language Versions

Two texts are available in Spanish: *Science for All Americans* (OUP Mexico, \$14.80 USD), and *Benchmarks for Science Literacy* (OUP Mexico, \$12.70 USD). Available in Chinese are *Science for All Americans*, *Benchmarks for Science Literacy*, and *Blueprints for Reform*.

Professional Development Services Available

Project 2061 Professional Development Programs offer customized workshops on understanding benchmarks and standards and aligning curriculum and assessment to them. PDP also offer the regional Focus on Standards for Science and Mathematics workshop in cities across the United States.

Evidence of Effectiveness

Science for All Americans and *Benchmarks for Science Literacy* serve as key reference materials for states developing and revising their standards. The *Project 2061* textbook evaluation procedure and evaluations of specific textbooks are being used as aids in the selection and development of science and mathematics textbooks.

Contacts and Web Sites

Mary Koppal, AAAS Project 2061, 1200 New York Avenue, NW, Washington, DC 20005
Phone: 202-326-6666
<http://www.project2061.org>

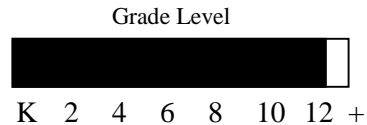
Publishers

AAAS/Project 2061 Ordering Department, 1200 New York Avenue, Washington, DC 20005
Phone: 888-737-2061; Fax: 202-842-5196

Oxford University Press, Ordering Dept., 2001 Evans Road, Cary, NC 27513
Phone: 800-451-7556
<http://www.oup-usa.org>

Oxford University Press Mexico, S.A. de C.V., Antonia Caso 142, Col. San Rafael, 06470 Mexico, D.F. Mexico
Phone: 525-592-5600; Fax: 525-705-3738; E-mail: oxford@oupmex.com.mx

The Center for the Enhancement of Science and Mathematics Education (CESAME)



The Center for the Enhancement of Science and Mathematics Education (CESAME) is a non-profit K–12 mathematics and science education reform organization supported by the NSF, Northeastern University, and other public and private organizations. CESAME has gained recognition locally, regionally, and nationally for its efforts in creating awareness and supporting implementation of standards-based curricula, and for providing high-quality professional development in mathematics and science.

The five-year IMPACT project (<http://projects.terc.edu/impact>) strives to accelerate the implementation of standards-based instructional materials throughout New England. CESAME uses the experience gained with its Statewide Implementation Program (SIP) to inform this scaled-up regional effort. Because the decision to use standards-based materials is made at the local level, IMPACT’s plan builds on existing regional structures to provide the information, resources, and support for districts and their teachers in this next step in education reform.

SIP was designed to demonstrate how districts could successfully implement specific standards-based curricula. Through SIP, CESAME provides districts with multi-year funding, implementation guidance, professional development guided by curriculum developers, and links to statewide and national reform efforts. SIP also conducts research that seeks to identify the elements of effective models for successful implementation.

The Teacher Innovation Program (TIP) allows CESAME to support classroom teachers as they create and implement innovative teaching strategies that improve children's access to, excitement about, and understanding of mathematics and science. TIP’s goal is to identify promising teacher innovations and to strengthen them by providing financial support, technical assistance, and help in disseminating the projects.

Contact and Web Site

Center for the Enhancement of Science and Mathematics Education, Northeastern University,
716 Columbus Avenue, Suite 378, Boston, MA 02120
Phone: 617-373-8380; Fax: 617-373-8496
<http://www.dac.neu.edu/cesame>

Eisenhower National Clearinghouse for Mathematics and Science Education

Grade Level



K 2 4 6 8 10 12 +

The Eisenhower National Clearinghouse for Mathematics and Science Education (ENC) was established by the U.S. Department of Education in 1992 at the Ohio State University. ENC's mission is to identify effective curriculum resources, create high-quality professional development materials, and disseminate useful information and products to improve K–12 mathematics and science teaching and learning.

ENC houses the nation's most comprehensive collection of mathematics and science curriculum resources. Its extensive Web site (www.enc.org) includes the electronic catalog of K–12 curriculum materials held in the ENC Collection. With input from teachers on the types of information they want to see in a catalog record, ENC developed a unique and comprehensive system. Each record includes standard library fields as well as fields unique to the needs of educators (resource type, grade level, table of contents, and evaluation). Other products include free print and CD-ROM publications on a variety of topics. *ENC Focus* is a theme-based quarterly magazine, providing information about innovative K–12 mathematics and science materials.

The Resource Center at ENC on the campus of the Ohio State University is staffed by a professional reference librarian to answer questions about mathematics and science education and to make the best use of ENC. This service is available to all clients who visit and via e-mail, fax, and telephone. ENC products and services are also available through regional Demonstration Sites and local Access Centers, which are maintained by the Eisenhower Regional Consortia. See the ENC Partners section on the Web site for more details.

ENC collaborates with the Eisenhower Regional Consortia on three major goals: 1) to identify and disseminate exemplary math and science instructional materials; 2) to provide technical assistance to educators in implementing teaching methods and assessment tools; and 3) to collaborate with state, local, regional, and national organizations engaged in educational improvement.

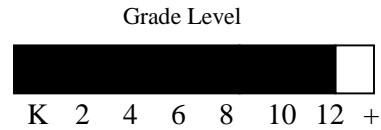
Implementation Costs

All ENC products and services are free.

Contact and Web Site

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The Ohio State University, 1929 Kenny Road, Columbus, OH 43210-1079
Phone: 800-621-5785; 614-292-7784; Fax: 614-292-2066; E-mail: info@enc.org
<http://www.enc.org>

Mid-Atlantic Eisenhower Regional Consortium for Mathematics and Science Education @ RBS



Research for Better Schools, Inc. (RBS) houses the Mid-Atlantic Eisenhower Regional Consortium for Mathematics and Science Education. The Consortium provides customized services, resource dissemination, and support for professional development in the District of Columbia, Delaware, Maryland, New Jersey and Pennsylvania. Since its establishment by Congress in 1992, the Consortium has served as one of the nation's 10 Eisenhower Regional Consortia that are funded by the U.S. Department of Education and that form the Eisenhower Network, which includes the Eisenhower National Clearinghouse (see previous entry).

A regional board and the five State Teams guide the Consortium's technical assistance and training activities. The Consortium supports providers of professional development, supports conference attendees, and collaborates with specific schools and institutions on needs assessment and other projects. In addition, the Consortium convenes regional conferences on relevant issues such as promising curriculum and instructional practices, professional development, and high-performance standards.

Providing the region's pre-collegiate educators with access to exemplary mathematics and science resources is another important goal of the Consortium. The Consortium offers the following resources, all of which are accessible through RBS's Web site:

- Extensive resource lists and Web links for educators at all levels
- Access to free and low cost print and multimedia resources
- Newsletters delivered by e-mail, mail, and online
- Up-to-date news postings and calendars of mathematics and science events
- E-mail lists that allow users to inform and be informed about state and topical issues.

Implementation Costs

Mid-Atlantic Eisenhower Regional Consortium products and services are free.

Contact and Web Sites

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<http://www.rbs.org>

The Eisenhower Network
<http://www.mathsciencenetwork.org>

