

Examples of Era 3, 21st Century Curriculum Programs and Materials*

By Elliott Seif

Selecting good quality materials and textbooks can significantly help to support Era 3, 21st Century teaching and learning in the classroom. Figure one on the next page contains a summary of Era 3 curriculum materials selection criteria.

Unfortunately, there seem to be relatively few curriculum materials that meet the major criteria of Era 3 teaching and learning. This is probably because most national commercial curriculum materials are designed to meet the criteria for acceptable curricula in all 50 states, which often makes them a hodgepodge of a fragmented and overwhelming number of facts, concepts, instructional approaches, and assessments. Often these materials are developed by committees, whose compromises lead to materials that are unfocused, unaligned, incoherent, and ‘coverage’ based.

Some evidence exists to illustrate these problems. The American Association for the Advancement of Science’s Project 2061 (www.project2061.org) analyzed numerous commercial mathematics and science textbooks in the 1990’s and found that very few of them meet carefully developed criteria with an understanding based approach. The Coalition of Essential Schools also analyzed textbooks in the 1990’s, and indicated that few best selling textbooks meet understanding based criteria. Not much has changed over the years to suggest that today’s texts are much different from those published in the 1990’s.

On the following pages are some educational programs and materials suggested over the years by a number of organizations and curriculum experts that meet some of all of the criteria in figure one. Much of the descriptions below are adapted from the publishers or developers of the materials. Additional programs and materials are also suggested that meet 21st century goals (such as Habits of Mind and International Baccalaureate).

The reader should be aware that this is only a beginning list -- there may be many more materials and textbooks that meet these criteria. A good school or district-based curriculum development process should include a search for materials that meet these materials selection criteria. The reader should also be forewarned that the materials listed below should be examined and analyzed in order to determine whether they fit with the curricular approach determined by the school, district, state, etc., and not automatically accepted.

If you are aware of any other sources of curriculum materials that meet some or all of the criteria on the next page, please e-mail the source of these materials to:

era3learning@gmail.com

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Figure One –Era 3, 21st Century Materials Selection Criteria

#1 –Do the materials focus on big ideas and/or essential questions?

Look for the extent to which the materials identify a limited number of big ideas – concepts, themes, issues, etc. – that promote student understanding, and include provocative essential questions around which knowledge is examined. Be aware that these big ideas may be explicitly stated but can be also implicitly developed within the materials and textbooks.

#2 – Do the materials require learners to learn and use a variety of Era 3 inquiry and investigative skills?

Look for continual instruction and assessment opportunities for students to be able to ask key questions, define problems and challenges, think deeply and reflectively, draw conclusions and apply learning, and communicate effectively. Also look for ample opportunities to learn and to use high level processes and skills, such as research, scientific inquiry, strategic reading, writing, problem solving and decision-making, and creative thinking.

#3 – Do the materials include valid and varied assessments - both traditional and performance-based – that support the application and transfer of knowledge and skills?

Look for a variety and balance between traditional assessments and performance tasks, and between summative and formative assessments. Look for the validity of the assessments – the connections between the assessments and the goals of the materials. How do assessments help students to apply and transfer learning in order to demonstrate understanding and apply learning to new and novel situations?

#4 – Are the materials focused around interactive and engaging activities?

Look for activities that help students master understanding, inquire into essential questions, explain and explore their understanding, promote interaction between teachers and students, motivate student learning, and help students make meaning.

#5 – Do the materials continually revisit and refine big ideas?

Look for materials that are coherent – e.g., use big ideas and questions to develop ideas in greater depth and inquire into them over time (learning progressions). Examine the coherence of the materials by determining how well they revisit, refine, and reflect on ideas and/or explore the same or similar questions over time.

#6: Do the materials reflect a “developmentally appropriate” approach to student learning?

Look for materials that support rigorous academic learning of big ideas and essential questions, but are not so far above or below the current abilities of the learner that they stifle learning.

#7 – Are the materials geared to the diverse abilities, interests and needs of students?

Look for the ways that the materials support the varied needs of students in a diverse classroom environment, including special education students. Also look for ways that the materials and strategies incorporate multiple student intelligences and learning styles.

#8 – Is the curriculum program based on text alone, or does it include many different types of materials, including technology-based learning?

Look for whether the text is the sole source of information or whether there are multiple resources incorporated into the materials that allow for thoughtful learning and inquiry. Look at the role technology plays in supporting the program’s goals.

#9 – Do the materials encourage interdisciplinary connections?

Look for ways that the materials encourage interdisciplinary connections, such as by integrating big ideas and essential questions and/or integrating skills and processes across disciplines.

#10 – Are the materials and instructional plans well organized and easy to use (teacher friendly)?

Look at whether the program is well-organized, how big ideas and essential questions are clearly organized and made explicit throughout the materials, how well developed and organized is each unit and lesson, how assessments and materials are integrated throughout the program, how accessible suggested outside materials are, and how easy it is to adapt the program to a teacher’s own style. Also consider whether there are professional development resources available in order to implement the program successfully.

#11 – Are outside experiences, including family involvement, part of the learning experience?

Look for authentic learning experiences to be an on-going part of the curriculum materials. Also look for many opportunities for parents to work with their children in order to supplement learning experiences. Supplemental student materials, such as study guides, should also help students organize their learning and thinking.

Suggested Era 3 Curriculum Materials

The Arts -----

*The *Getty Education Institute for Education in the Arts* has programs and education resource materials that help with curriculum development and arts instruction-- model units, reproductions, materials, and online networking are available. Much of these materials promote an understanding of the visual arts and an integration of the arts across the curriculum. The Getty Museum is located at 1200 Getty Center Drive, Suite 600, Los Angeles, CA 90049-1683, 310 440-7300; Web address: <http://www.getty.edu/education/>

*The *Kennedy Center for the Performing Arts*, in Washington, D.C., has an entire education section devoted to sharing curriculum and teaching ideas. There is a also a section on “themes” that provides “big ideas” for the arts. The “*ArtsEdge*” section of their website can be reached through: <http://artsedge.kennedy-center.org/educators.aspx>

Creative Thinking-----

**Design Thinking* is a structured approach to generate and develop new ways to solve difficult problems and challenges. Design Thinking starts with a challenge, and then works through a series of steps to help find creative solutions to the challenge, such as empathy, interpretation, brainstorming and choosing alternatives, building models, and planning for implementation. The process can be used to help solve school challenges or world-wide challenges. It includes learning additional skills such as finding reliable information, developing surveys and questionnaires, and building interview skills. It can be adapted to be used with students at all ages.

Economics and Entrepreneurship (NFTE)

**Network for Teaching Entrepreneurship (NFTE)*

Entrepreneurship education is a tool that can equip young people to not only start businesses and create jobs, but also to be opportunity-focused, flexible employees ready to fill existing jobs. NFTE fosters the creation of entrepreneurship skills, businesses and the development of an adaptable, driven and opportunity-focused workforce that ultimately promotes economic stability. External research has shown that NFTE graduates start and maintain businesses at substantially higher rates than their peers. Other research findings indicate that students develop:

- Increased interest in attending college
- Greater occupational aspirations
- Improved scores in independent reading

Working with schools in low-income communities where at least 50% of the students are eligible for free or reduced price lunch, NFTE targets young people who are at risk of

dropping out of school, and helps them graduate with their own personal plans for success. The program, *Highly Academic*, is a semester or year-long class with a NFTE-certified teacher who guides students through one of the curricula: *Entrepreneurship: Owning Your Future* or *Exploring Careers for the 21st Century*. Lessons include the concepts of competitive advantage, ownership, opportunity recognition, marketing, finance, and product development - and all tie back to core math and literacy skills. Lessons include field trips, games and experiential activities. Classes regularly have guest speakers. Students are paired with coaches who help students work on their business plans, and business plan competitions are judged by local entrepreneurs and business people.

Each young person who takes a NFTE class works toward completing a business plan, then goes on to present and defend it in a classroom competition. The winners of these competitions go on to compete in citywide or regional competitions, with the hopes of reaching our [annual national competition](#).

For more information, go to: <http://www.nfte.com>

“Habits of Mind” Programs-----

Habits of Mind is an approach to teaching and learning developed by Art Costa and Bena Kallick. It has been converted into a course based high school program at the Community High School of Vermont. Information and lessons based on this program can be obtained at the following site in pdf file format:

http://www.chsvt.org/wdp/Habits_of_Mind_Curriculum_VT_WDP.pdf

Roots of Empathy is an evidence-based classroom program that has shown dramatic effect in reducing levels of aggression among schoolchildren by raising social/emotional competence and increasing empathy. The program reaches elementary schoolchildren from Kindergarten to Grade 8.

At the heart of the program are a neighborhood infant and parent who visit the classroom every three weeks over the school year. A trained ROE Instructor coaches students to observe the baby's development and to label the baby's feelings. In this experiential learning, the baby is the "Teacher" and a lever, which the instructor uses to help children identify and reflect on their own feelings and the feelings of others. This "emotional literacy" taught in the program lays the foundation for more safe and caring classrooms, where children are the "Changers". They are more competent in understanding their own feelings and the feelings of others (empathy) and are therefore less likely to physically, psychologically and emotionally hurt each other through bullying and other cruelties. More information can be found at: <http://www.rootsofempathy.org>

The Leader in Me and *The Seven Habits of Highly Effective Teens* Programs give young people at both the elementary and secondary levels a set of proven tools to deal successfully with real life. The training is a means for educators, administrators, and superintendents to help improve student performance; reduce conflicts, disciplinary problems, and truancy; and to enhance cooperation and teamwork among parents,

elementary age children, teens, and teachers. *The 7 Habits* are essentially seven characteristics that happy and successful children the world over have in common. Habits 1, 2, and 3 deal with self-mastery, called the "private victory." Habits 4, 5, and 6 deal with relationships and teamwork, or the "public victory." The last habit, Habit 7, is the habit of renewal. It feeds all the other six habits.

More information can be found at:

<http://www.theleaderinme.org/> (The Leader in Me, Elementary Program)

<http://www.seancovey.com/teens.html> (The Seven Habits of Highly Effective Teens)

Health-Physical Education -----

**Developmental Approaches to Science and Health (DASH)* is a comprehensive articulated K-6 elementary science/health program brings the working worlds of technologists and scientists into elementary classrooms. Each year builds on the previous years and concepts are spiraled from year to year. The DASH program teaches students to become aware of the social impact of science and technology on their lives both in and out of school. Students leave the program with an understanding of basic concepts of the physical, biological, and earth sciences that they will need in secondary school, understanding of their own nutritional needs and biological processes, and understanding of the destructive effects of disease and drugs. In the DASH curriculum, students use kinesthetic, spatial, and visual modes of learning as well as linguistic and mathematical modes while working in cooperative communities.

DASH materials are sequential and accommodate variations in student developmental stages and concept, skill, and cognitive style differences through hands-on, activity-based materials rooted in real-world, concrete, practical experiences. Graphic, oral, writing, lyrical, and kinesthetic - as well as reading - modes of communication are built into the program. Cooperative group projects permit peer sharing, teaching, and differential contribution. Students also conduct explanatory investigations rooted in real world application.

DASH is published by the Curriculum Research and Development Group, University of Hawaii. For more information, contact: Science Section, The Curriculum Research & Development Group, 1776 University Avenue, UHS Building 2, Rm 202 Honolulu, HI 96822-2463; 808-956-6918; Website:

<http://manoa.hawaii.edu/crdg/subject/science/>

(Note: This program is also listed under Science Education)

**Physical Best* is a program of the National Association for Sport and Physical Education (NASPE), an association of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD). It is a comprehensive, health-related fitness education program, for use in K-12 physical education programs. The emphasis is on students' work toward obtaining and maintaining a healthful level of:

- Aerobic Fitness
- Muscular Fitness
- Flexibility
- Body Composition

Physical Best is not intended to be a stand-alone program. Its concepts and activities are designed for integration into a physical education program throughout the school year.
Website: www.naspeinfo.org/physicalbest

History/Social Studies/Civic Education -----

**Read Like a Historian* curriculum (75 primary source based lessons in American history) engages students in historical inquiry around a central question and the use of primary documents. The curriculum teaches students how to investigate historical questions employing reading strategies such as sourcing, contextualizing, corroborating, and close reading. Instead of memorizing historical facts, students evaluate the trustworthiness of multiple perspectives on numerous historical issues, and make historical claims backed by documentary evidence (adapted from the website). The materials are closely related and linked to the Literacy Common Core Standards.
Website: <http://sheg.stanford.edu/?q=node/45>

*The DBQ (Data Based Questions) project is a series of primary source document activities and assessments that focus on close reading and evidence-based writing. Many of the DBQ Project's activities and assessments require students to compare differing historical accounts. The DBQ Project's "buckets" system is useful for preparing students to answer DBQs on Advanced Placement exams. The DBQ Project comes in United States and global history editions.
Website: <http://www.dbqproject.com/>

**Teacher's Curriculum Institute* curricular programs, K-12, offer supplementary or stand-alone curriculum materials, integrate U.S. and world history programs with the arts, use essential questions, and systematically build significant processes and skills. Interactive, engaging activities promote the development of a number of key skills, including experiential learning, writing, and problem solving. Most programs incorporate culminating tasks for units and courses of study. *History Alive!* comprises the middle and high school sets of curricular materials available for different courses, such as American and World History. *Social Studies Alive!* (the elementary program, K-5) includes textbooks and is built around essential questions. Newer materials at the middle and high school levels also offer materials with essential questions and texts along with teacher's guides. Teacher's Curriculum Institute offers a rich array of staff development built around interactive instructional strategies (Teachers Curriculum Institute, PO Box 1327, Rancho Cordova, CA 95741 , 800-497-6138;
Website for *History Alive!* and *Social Studies Alive!*: <http://www.teachtoi.com/>

*"*World History for Us All*" provides a world history approach that focuses on "big Ideas" and three essential questions. The program offers a powerful approach for figuring out how to systematically teach the huge amount of information covered by World History. Information can be found at:
<http://worldhistoryforusall.sdsu.edu/default.htm>

*The *National Center for History in the Schools* contains all sorts of information about teaching history, often focused around key ideas and critical skills. They also sell history units that revolve around themes. **Website:** <http://nchs.ucla.edu/>

Coverdell World Wise Schools*, a program of the Peace Corps, offers a treasure trove of resources for teaching social studies. The program is designed to broaden perspectives in culture and geography and to encourage service learning. There's the Correspondence Match program that puts you in touch with a currently serving Peace Corps Volunteer. There are innumerable lessons about cultures and countries worldwide. Their website contains free cross-cultural publications, award-winning videos, stories, folk tales, classroom speakers, and more. **Website: <http://www.peacecorps.gov/wws/>

**A History of US* by Joy Hakim, is a ten volume chronicle of the history of the United States, from pre-colonial times to the present day. The books are geared for students, grades 6-12. The author interprets American history by focusing on “big ideas” and including material that illustrates daily life, social attitudes, contemporary concerns and dilemmas, and political climate. Sidebars are used to raise questions in order to stimulate an analysis of how the facts are presented as they relate to various periods in history. Each volume focuses on a different period of history, and a teacher’s guide outlines the big ideas and potential units of study. (Note that some adult readers feel that the books are biased in their interpretation of history).

These books can be purchased through most bookstores and Internet book sites.

Facing History and Ourselves* engages teachers and students of diverse backgrounds in an examination of racism, prejudice, and anti-semitism in order to promote the development of a more humane and informed citizenry. By studying the historical development of the Holocaust and other examples of collective violence, students make the essential connection between history and the moral choices they confront in their own lives. Facing History encourages young people to develop a voice in the conversations of their peer culture, as well as in the critical discussions and debates of their community and nation. (16 Hurd Road, Brookline, MA 02445; tel.: 617-232-1595; fax 617-232-0281; **Web address: www.facing.org)

*The *American Social History Project* produces curriculum materials for high school history, including “Freedom's Unfinished Revolution” and “Who Built America?” For example, the *Who Built America?* textbook surveys the nation's past from the perspective of working men and women, examining the roles they have played in the making of modern America. Growing out of the effort to reinterpret American history from "the bottom up," *Who Built America?* not only documents the country's presidents, politics, and wars along with the life and values of the nation's elite but also focuses on the fundamental social and economic conflicts in our history, integrating the history of community, family, gender roles, race, and ethnicity into the more familiar history of politics and economic development. Many New York Essential schools have participated in its programs linking the print, video and multimedia materials, and scholars of the

Center for Media and Learning to classrooms. American Social History Project/Center for Media and Learning, The Graduate Center, CUNY, 365 Fifth Avenue, Room 7389 , New York, New York 10016, Tel: 212-817-1966;

Web address: <http://www.ashp.cuny.edu>

*The *Gilder Lehrman Institute (GLI) of American History* is a nonprofit organization devoted to the improvement of history education. The Institute has developed an array of programs for schools that focus on teaching with primary source documents. The GLI site provides access to the GLI Collection (featuring more than 60,000 unique historical documents), teacher resources, and lesson plans. The History Now newsletter is organized by period and links lessons by grade level. The multimedia section includes lectures by eminent historians, online exhibits, and podcasts. New additions include a set of Common Core aligned lesson plans and a list of UBD-compatible essential questions. GLI materials are free. Some of the site's resources are limited to registered users. Schools that apply and are accepted to be GLI Affiliates gain access to all of GLI's resources. GLI Affiliate school teachers have the opportunity to participate in GLI summer professional development seminars.

Web address: <http://www.gilderlehrman.org/>

*The *Social Studies School Service* is a major resource for social studies materials, K-12, that meet many or all of the materials selection criteria. It houses a huge number of social studies materials for most topics and grade levels. Browse the sections of this service for resources, or order the catalogues to peruse at leisure. You can also get on their e-mail lists to receive timely e-mails about relevant materials.

Website: <http://www.socialstudies.com/>

**SPICE* - The Stanford Program on International and Cross Cultural Education - consists of over 100 global studies units that explore contemporary issues via historical and cultural analysis. SPICE is a non-profit educational program and receives funding from the Freeman Spogli Institute for International Studies at Stanford University. SPICE activities engage students with an array of multiple perspectives to engender critical thinking skills. The SPICE units vary in price and can be purchased in bundles.

Website: <http://spice.stanford.edu/>

*The *Library of Congress American Memory digital archive* makes available primary materials of all kinds on the Web, including documents, photographs, music, drawings, pamphlets, oral history transcripts, and recorded speeches. Educators can search for curricular support in collections like the Afro-American Pamphlets (1818-1907), the Carl van Vechten photographs of the Harlem Renaissance era, documents from the Continental Congress, sound recordings of speeches by American leaders, and the history of women's suffrage.

Web addresses: www.loc.gov; <http://digitalvaults.org/>

*Another excellent set of (mostly U.S.) historical documents, from the Magna Carta and the Iroquois Constitution to the latest State of the Union address, can be found at The University of Oklahoma Law Center

Website: <http://www.law.ou.edu/hist/>

**Historical Thinking Matters (HTM)* is a website focused on key topics in U.S. history, that is designed to teach students how to critically read primary sources and how to critique and construct historical narratives. HTM includes four student investigations that focus on key topics in the standard post-Civil War U.S. History curriculum. It also includes a video on “Why Historical thinking Matters”.

Website: <http://historicalthinkingmatters.org/>

**The Choices for the 21st Century Education Program* is a national education initiative based at Brown University's Watson Institute for International Studies. The program seeks to empower young people with the skills, knowledge, and participatory habits to be engaged citizens who are capable of addressing international issues through thoughtful public discourse and informed decision making. The Choices Program develops teaching resources on historical and current international issues, provides professional development for classroom teachers, and sponsors programs that engage students beyond the classroom.

Website: <http://www.choices.edu/about/index.php>

**The Zinn Education Project's* goal is to introduce students to a more accurate, complex, and engaging understanding of United States history than is found in traditional textbooks and curricula. The empowering potential of studying U.S. history is often lost in a textbook-driven trivial pursuit of names and dates. Zinn's *A People's History of the United States* and *Voices of a People's History of the United States* emphasize the role of working people, women, people of color, and organized social movements in shaping history. Students learn that history is made not by a few heroic individuals, but instead by people's choices and actions, thereby also learning that their own choices and actions matter. The project's coordinators believe that through taking a more engaging and more honest look at the past, we can help equip students with the analytical tools to make sense of — and improve — the world today. The website has extensive resources, including units of study organized by time period and theme.

For more information and extensive teaching resources, go to: <http://zinnedproject.org/>

**The Center for Civic Education's* mission is to promote an enlightened and responsible citizenry that is committed to democratic principles and actively engaged in the practice of democracy in the United States and other countries. The Center administers a wide range of critically acclaimed curricular, teacher-training, and community-based programs in conjunction with civic educators and activists around the world. Ultimately, the Center

strives to develop an enlightened citizenry by working to increase understanding of the principles, values, institutions, and history of constitutional democracy among teachers, students, and the general public. For more information, resources, and a huge number of weblinks, go to: <http://new.civiced.org/>

Interdisciplinary Multi-Subject Programs-----

LITERACY

*“*Word Generation* is a middle school academic language program developed under the direction of Harvard University Professor Catherine Snow, one of the nation’s most prominent experts in literacy. The program originated at the SERP-Boston field site in collaboration with teachers and administrators in the Boston Public Schools. It is geared toward all students, in all subject areas, and can be used in all three middle grades simultaneously. The program is strategically designed to create a coherent school-wide effort that gives students the sustained exposure to academic language they need for success in school—even while demanding relatively little (15 minutes, once a week) from any single subject area teacher.” (from the website description) The program is focused around conflict issues relevant to middle school students, and is designed to engage them in the learning process.

Further information about the program, along with the ability to download the materials without cost (but with a registration) can be found at: <http://wg.serpmedia.org> (This information is also included in the Reading/Language Arts section)

STEM

STEM (Science, Technology, Engineering, and Mathematics) programs and materials are designed to integrate the four areas generally through “design” projects.

**Engineering is Elementary (EIE)* consists currently of twenty STEM units designed for the elementary grades. Each EIE unit ties in with an elementary science topic and is meant to be taught either concurrently or after students learn the appropriate science content in life science, earth and space science and physical science areas. Each unit has five “lessons” (lessons can be more than one day).

The units attempt to combine learning in a science area with engineering concepts. Engineering projects integrate other disciplines. Engaging students in hands-on, real-world engineering experiences can enliven math and science and other content areas. Engineering projects can motivate students to learn math and science concepts by illustrating relevant applications. They foster problem-solving skills, including problem formulation, iteration, testing of alternative solutions, and evaluation of data to guide decisions.

Learning about engineering increases students' awareness of and access to scientific and technical careers. The number of American citizens pursuing engineering is decreasing. Early introduction to engineering can encourage many capable students, especially girls

and minorities, to consider it as a career and enroll in the necessary science and math courses in high school.

For more information, go to: <http://www.eie.org/>

Other STEM resources include:

**Engineer Your World*: <http://www.engineeryourworld.org> (high school)

**Project Lead the Way*: <http://www.pltw.org> (high school)

**Engineering and biomedical science curriculum: Project Lead the Way*
<http://www.pltw.org>

**Biomedical and health science curriculum:*

<http://www.connectedcalifornia.org/curriculum/units.php>

**Business, economic and technology skills curriculum from the Ford Partnership for Advanced Studies (PAS) Curriculum:*

<http://fordpas.org>

**Digital media arts curriculum from the Education Development Center:*

<http://dma.edc.org>

**The STEM Education Coalition:*

<http://nstacomunities.org/stemedcoalition/>

**STEM programs connected to Minnesota, with a number of suggested resources:*

<http://www.mn-stem.com/>

**Touchstones* discussion project uses fables, poems, art, literature from diverse cultures, and other readings to help students build a better understanding of the world around them. It is designed to build critical thinking and active listening skills, communication, cooperative learning and problem solving. It promotes the development of reading strategies and creative problem solving.

The program is organized at the elementary, middle and high school levels for use ***with a variety of subject areas***. For example, classes in middle school science and mathematics might use the text, “Where’d They Get That Idea?” designed to clarify highly abstract and theoretical concepts such as the expanding universe, larger and smaller infinities, and other scientific laws and mathematical axioms. High school students read such authors as Aristotle, Machiavelli, Home and Euclid in order to tackle issues of ethics, science, civic responsibility and authority. There is also an after school program component.

For further information, contact Touchstones discussion project, 522 Chesapeake Ave. Annapolis, MD 21403, 800 456 6542. Website: www.touchstones.org

*The *Buck Institute for Education* (BIE) is a major source of information for designing projects in all subject areas. It is dedicated to improving 21st Century teaching and learning throughout the world by creating and disseminating products, practices and knowledge for effective Project Based Learning. Its website is: <http://www.bie.org/>

Mathematics Programs -----

Links to Secondary Mathematics Programs

The following weblink provides comprehensive information and links in one place to a variety of secondary mathematics programs, many of which are listed below. Go to:

http://faculty.kutztown.edu/schaeffe/CurrClasses/MAU580/MAU580_Links.html

Elementary and Middle School Math Curricula

**Cognitively Guided Instruction (CGI)* is a professional development program that increases teachers' understanding of the knowledge that students bring to the math learning process and how they can connect that knowledge with formal concepts and operations. The program is based on the premise that children throughout the elementary grades are capable of learning powerful unifying ideas of mathematics that are the foundation of both arithmetic and algebra. Learning and articulating these ideas enhance children's understanding of arithmetic and provide a foundation for extending their knowledge of arithmetic to the learning of algebra.

CGI is guided by two major ideas. The first is that children bring an intuitive knowledge of mathematics to school with them and that this knowledge should serve as the basis for developing formal mathematics instruction. This idea leads to an emphasis on working with the processes that students use to solve problems. The second key idea is that math instruction should be based on the relationship between computational skills and problem solving, which leads to an emphasis on problem solving in the classroom instead of the repetition of number facts, such as practicing the rules of addition and subtraction.

With the CGI approach, teachers focus on what students know and help them build future understanding based on present knowledge. The program aims to improve children's mathematical skills by increasing teachers' knowledge of students' thinking, by changing teachers' beliefs regarding how children learn, and by ultimately changing teaching practice. In 1996, CGI was extended into the upper elementary school levels to assist first through sixth grade teachers in integrating the major principles of algebra into arithmetic instruction.

There is no set curriculum. Teachers use the CGI framework with existing curriculum materials, or they use CGI principles to help develop their own math curriculum.

For more information, go to:

<http://www.promisingpractices.net/program.asp?programid=114#programinfo>

**Everyday Mathematics* is a Pre-K to sixth grade enriched, comprehensive, and balanced mathematics curriculum, developed by the University of Chicago School Mathematics Project. It is based on extensive research, teacher input and field-testing. Students learn computational skills as well as a broad range of mathematics concepts including data and probability, geometry and spatial sense, measures and measurement, algebra and uses of variables. Information about this program can be obtained from the following website:

<http://everydaymath.uchicago.edu/>

**Investigations in Number, Data, and Space.* *Investigations* offers K-5 activity-based mathematics materials that encourage students to think creatively, develop and articulate their own problem-solving strategies, and work cooperatively with their classmates. Many *Investigations* activities involve engaging games that reinforce students' understanding of important mathematical concepts and skills. Districts either use these as supplemental materials to more traditional elementary programs, or as a stand-alone elementary program. Pearson Education, One Lake Street, Upper Saddle River, NJ 07458: tel.: 800-552-2259:

Website: <http://investigations.scottforesman.com>

**The TIMS Project (Teaching Integrated Mathematics and Science)* at the University of Illinois at Chicago is the developer of a textbook series entitled *Math Trailblazers*. The series consists of a research-based, K-5 mathematics program integrating math, science, and language arts. *Math Trailblazers* is based on the beliefs that the organized investigation of everyday situations is an ideal setting for learning mathematics and all students deserve a richer and more challenging curriculum. A fundamental principle of *Math Trailblazers* is that mathematics is best learned through active solving of real problems. Lessons are grounded in everyday situations, so abstractions build on experience. Students' skills, procedures, and concepts emerge and develop as they solve complex problems. The curriculum introduces challenging content at every grade level, including computation, measurement, data collection, statistics, geometry, ratio, probability, graphing, simple algebra, estimation, mental arithmetic, and patterns and relationships. The curriculum also integrates mathematics with many disciplines, especially science and language arts. Scientific investigations embedded in many units use the TIMS Laboratory Method, an organized method of investigation appropriate for elementary school children. Each grade level has 16-20 units; units range from one to three weeks long. *TIMS Project materials/Math Trailblazers* information can be obtained from: <http://www.lsri.uic.edu/projects/tims.asp>

**Think Math!* is a comprehensive kindergarten through fifth grade curriculum that provides high-quality mathematics for all children. This pilot and field-tested curriculum was developed by Education Development Center, Inc. (EDC) in Newton, MA under the working title *Math Workshop*, with support from the National Science Foundation. The series is published by *School Specialty Math* website: [http://www.schoolspecialty.com/Think Math!](http://www.schoolspecialty.com/ThinkMath/) does not pit skill against problem solving. Rather, it builds computational fluency through plentiful practice in basic skills as students investigate new ideas and solve meaningful problems. Lessons provide glimpses of ideas to come, letting students build familiarity and develop conceptual understanding as they apply, sharpen, and maintain skills they already have. *Think Math!* promotes the teaching of key algebra concepts at all grade levels, making it easier to learn and understand algebraic ideas when the time comes to do so. It is aligned with NCTM's *Principles and Standards for School Mathematics* (2000) and features ongoing assessments to measure student understanding and progress. For further information, go to: <http://www2.edc.org/thinkmath/>

**MathScape* is a comprehensive, three-year middle school mathematics curriculum that focuses on mathematics in the human experience. The curriculum focuses on four mathematical strands that develop across the three grade levels: number, algebra, geometry and measurement, and statistics and probability. Throughout the 21 units of this curriculum (7 at each grade level), students experience mathematics as fundamental to human endeavors throughout the world and throughout history--endeavors such as planning, predicting, designing, creating, exploring, explaining, coordinating, comparing, and deciding. The main component of each lesson is a hands-on investigation in which students explore mathematical concepts. Students often share and compare their approaches in group and class discussions. The final component of every lesson is a reflection piece in which students write about or discuss the mathematics they have been studying. *MathScape* supports students in learning mathematics by having them do mathematics, use and connect mathematical ideas, and actively construct their own understandings. Information can be obtained from: <http://www2.edc.org/mathscapetm>

**The Connected Mathematics Project* was funded by the National Science Foundation between 1991 and 1997 to develop a mathematics curriculum for grades 6, 7, and 8. The result was a complete research-based mathematics curriculum that helps students develop understanding of important concepts, skills, procedures, and ways of thinking and reasoning in number, geometry, measurement, algebra, probability, and statistics. It contains 24 units – eight units for each grade level that develop mathematical skills and conceptual understanding across mathematical strands. Important mathematical concepts are embedded in engaging problems. Students develop understanding and skill as they explore the problems individually, in a group, or with the class. The program also provides a complete assessment package that includes quizzes, tests, and projects. Key math concepts embedded in applications calling on technology. Information can be obtained from: <http://connectedmath.msu.edu/>

**Middle-school Math through Applications and Pathways Project (MMAP/Pathways)*. Developed by the Institute for Research on Learning at Stanford University, this applications-based curriculum comes with its own software aimed at introducing math concepts in alternative ways. Both MMAP and Pathways are specially designed to meet today's mathematics standards through engaging work-based projects.

Each project is:

- Technology infused

Software is used for designed and analyzing, and is central to most projects.

- Project based

Students get involved in designing and analyzing buildings, models, codes or maps, and learn mathematics while they are doing their project.

- Standards based

The programs meet the NCTM Standards and fulfill its principles.

Pathways to Algebra and Geometry is the commercial product based on MMAP.

Pathways materials are packaged in semester bins that contain the MMAP unit, modified for publication, skills practice sheets, student books and manipulatives. Pathway units are available as separate units or as a sequenced curriculum. Information on the program and

ordering information can be found at the following web address:

<http://mmmproject.org/pathways.htm>

**Mathematics in Context* is a comprehensive middle-school mathematics curriculum for grades 5-8. It was developed by the Wisconsin Center for Education Research in the School of Education at University of Wisconsin-Madison and the Freudenthal Institute at the University of Utrecht, The Netherlands. This dynamic curriculum challenges students to discover mathematical concepts and skills through engaging problems and meaningful contexts. Students in MiC:

- Develop mathematical models and strategies to solve problems
- Study number, algebra, geometry, data analysis, and probability
- Use numbers, symbols, diagrams, and words to describe the world around them.

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 other's strategies. 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 enables students to make sense of their world.

For information about the program, to to:

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

Mathematics in Context is published by Encyclopedia Britannica.

For further information about the program and ordering information, go to the web site: <http://mathincontext.eb.com/>

**MATHThematics* is a complete three-year mathematics curriculum for students in grades 6 to 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. Major mathematical strands of the program include: number concepts, measurement, probability, statistics, algebra, geometry, and discrete mathematics. 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 includes practice, review, and extension exercises that reinforce and extend learning.

For information about the program and publishing information, go to:

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

High School Math Curricula

Links to Secondary Mathematics Programs

The following weblink provides comprehensive information and links in one place to a variety of secondary mathematics programs, many of which are listed below. Go to: http://faculty.kutztown.edu/schaeffe/CurrClasses/MAU580/MAU580_Links.html

**ARISE (Applications/Reform in Secondary Education Mathematics): Modeling Our World* a grade 9-12 curriculum, uses realistic contemporary problems and themes to draw forth mathematical concepts in a mathematically sophisticated four-year high program that can be followed with a year of discrete math, statistics, or one of the new reform-minded calculus courses. The student-centered curriculum materials use a discovery approach and promote collaborative learning and integration with other content areas. Publisher is W.H. Freeman and Company, 41 Madison Ave. New York, NY 10010
1-800-446-8923

For further information visit the following website:

<http://www.comap.com/index.html>

**Interactive Mathematics Program (IMP)* offers a four-year, problem-driven high school course of study integrating topics in algebra, geometry, trigonometry, and pre-calculus with the study of statistics and probability, data analysis, and quantitative reasoning. The IMP curriculum integrates traditional topics in algebra, geometry, trigonometry and pre-calculus with additional topics recommended by the NCTM Standards, such as statistics, probability, data analysis, and quantitative reasoning. IMP units are generally structured around a complex central problem. Although each unit has a specific mathematical focus, other topics are brought in as needed to solve the central problem, rather than narrowly restricting the mathematical content. Ideas that are developed in one unit are usually revisited and deepened in one or more later units. More information about the program and ordering information can be found at the IMP website:

<http://www.mathimp.org/>

**Core-Plus Mathematics Project (CPMP)*. A three-year, research-based, integrated mathematics curriculum, plus a fourth-year course for college-bound students. Each year of the curriculum advances student understanding of mathematics along interwoven strands of algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics. These mathematical strands are developed in coherent, focused units that are connected by fundamental ideas such as function, symmetry, and data analysis; and by mathematical habits of mind such as visual thinking, recursive thinking, and searching for and explaining patterns. The curriculum is designed to make more mathematics accessible to more students, while at the same time challenging the most able students. Differences in students' performance and interest can be accommodated by the depth and level of abstraction to which core topics are pursued, by the nature and degree of difficulty of applications, and by opportunities for student choice on homework tasks and projects.

Further information about Core Plus and ordering information can be found on the Core Plus website: <http://www.wmich.edu/cpmp/>

The CME Project is a high school mathematics program that is funded by the National Science Foundation's research. It was developed by the Center for Mathematics Education, which is part of the Education Development Center. This program is structured around mathematics courses that include Algebra I, Geometry, Algebra II, and Precalculus—all of which are traditionally taught in high school grades. A guiding principle of CME is that the widespread utility and effectiveness of mathematics comes not just from mastering specific skills, topics, and techniques, but more importantly, from developing the ways of thinking—the habits of mind—used to create the results.

The CME Project helps teachers convey mathematical concepts through problem based, student-centered, and organized mathematical themes. It sets as its goal robust mathematical proficiency for all students by emphasizing the interplay between mathematical thinking and essential technical skills, and by providing a coherent curriculum with mathematical ideas, skills, and themes introduced early and deepened throughout the program.

For more information, contact the Educational Development Corporation at:

<http://www2.edc.org/cmeproject/index.shtml>

Positive Attitudes, Values, and Communication Skills-----

*The *Journey of a Champion Middle Grades* curriculum is a year-long course of study divided into 4 modules. It promotes academic excellence, character development, service-learning and citizenship. The curriculum is a catalyst for encouraging caring, thoughtfulness and good judgment through service and civic participation. Students gain civic engagement skills as they design community and school service projects. Civic skills developed include:

- Designing and implementing community interviews and surveys
- Service-learning/community project development and assessment
- Self-reflection
- Public speaking
- Persuasive writing skills
- Conflict resolution and problem solving
- Leadership and team building
- Professional etiquette and work readiness
- Building a personal portfolio

*The *Journey of a Champion High School Program* is a character education and service-learning curriculum for students in grades 9-12. Through this program, students learn how to act as responsible, caring and involved citizens who respect themselves and others and succeed academically.

Journey of a Champion invites students to learn about and reflect on the challenges they and their contemporaries face. It places those challenges in a historical context and leads students to develop strategies and skills that will help them confront those challenges. The journey "destination" is students creating and planning sustainable service and civic

participation. The curriculum affects positive change in students by:

- Developing character through community involvement
- Engaging students in active learning that demonstrates the relevance and importance of academic work for their life experiences and career choices
- Increasing awareness of past and current social issues
- Broadening and deepening perspectives of diversity issues, causes and solutions to conflicts, respect for self and others in their communities
- Enhancing critical thinking skills, with particular emphasis on conflict resolution, decision-making, and problem solving.

For more information, go to: <http://www.championsofcaring.org>

Reading/English/language Arts/Communications-----

**The Junior Great Books* program is designed to create the habits of mind that lead to a self-reliant thinker, reader and learner at all levels, K-12. Students read and interpret a variety of classic materials and texts as part of the program. The instructional approach, called Shared Inquiry, guides participants to search for answers to fundamental questions raised by a text. It is inherently an interactive process, with significant discussion of ideas, that is designed to help the reader grasp the full meaning of the text, to interpret or reach an understanding of the text in light of experience and through the use of sound reasoning. The program enlarges the conceptual understanding of students and increases their experiences with the world around them.

Information can be found at The Great Books Foundation, 35 East Wacker Drive, Suite 2300, Chicago, IL 60601-2298, 800 222 5870.

Website – www.greatbooks.org

“Word Generation is a middle school academic language program developed under the direction of Harvard University Professor Catherine Snow, one of the nation’s most prominent experts in literacy. The program originated at the SERP-Boston field site in collaboration with teachers and administrators in the Boston Public Schools. It is geared toward all students, in all subject areas, and can be used in all three middle grades simultaneously. The program is strategically designed to create a coherent school-wide effort that gives students the sustained exposure to academic language they need for success in school—even while demanding relatively little (15 minutes, once a week) from any single subject area teacher.” (from the website description) The program is focused around conflict issues relevant to middle school students, and is designed to engage them in the learning process.

Further information about the program, along with the ability to download the materials without cost (but with a registration) can be found at: <http://wg.serpmedia.org>

(Note: This program is also listed in Interdisciplinary programs).

For information about other SERP programs in development, go to:

<http://www.serp institute.org/2013/>

Science -----

**Inquiry in Action* is a major resource for an inquiry-based approach to teaching science for the elementary and middle school grades. It focuses on teaching core physical science and chemistry concepts. It is not a full-blown curriculum program, but rather an instructional guide and resource book that has a number of excellent activities. More information about the resource can be found at the following website. In addition, the guidebook and its activities can be downloaded without cost from this same website: <http://www.inquiryinaction.org/>

**Active Physics*, a high school curriculum emphasizing investigations in real-world contexts, was developed by Dr. Arthur Eisenkraft and leading physicists, physics teachers and science educators under the auspices of the American Association of Physics Teachers and the American Institute of Physics.

Usual physics course work over the year is very predictable: mechanics in the fall, followed by waves in the winter, then electricity and magnetism in the spring. In contrast, *Active Physics* takes a whole new approach. Keeping the National Science Education Standards in mind, it includes thematic science units the students can relate to: Communication; Home; Medicine; Predictions; Sports; Transportation and Light Up My Life.

Further information about the program and ordering information can be found on the following website: <http://www.its-about-time.com/htmls/ap.html>

*The *EDC Center for Science Education* provides information about many high quality science instructional materials that include:

- a focus on depth of understanding, rather than breadth of information.
- academically rigorous content framed in contexts relevant to students' lives.
- a focus on scientific thinking and reasoning through a careful balance of direct experience with phenomena, use of secondary resources, discourse, and writing.
- close attention to the needs of a diverse student body.
- the use of formative assessment to guide instruction and learning.

Information about the many programs available through EDC or through publishers that following these criteria can be found at: <http://cse.edc.org/curriculum/default.asp>

**Insights in Biology* is an introductory biology course intended to develop conceptual understanding through investigations of socially and personally significant issues. The program is organized into five thematic modules (The Matter of Life, The Blueprints of Infection, Different Stages Through the Ages, Traits and Fates, and What on Earth?), 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. Further information about the program and ordering information can be found on the *Insights* website,

through the Educational Development Corporation:

<http://cse.edc.org/curriculum/insightsBiology/>

*The *PRIME Science* series, written for middle school students, is an interdisciplinary, context-based, activity-driven science program integrating biology, chemistry, earth and space science, and physics. Developed with NSF funding at the University of California, Berkeley, with the University of York, England. Concepts from biology, chemistry, earth and space science, and physics, as well as the applications of science, are incorporated throughout the program. Science topics are introduced in personal and social contexts-- for example, ideas about speed and motion are presented in the context of travel and road safety. The program is published by Benchmark Education Company, 1-877-236-2465; <http://www.benchmarkeducation.com/general/prime-science.html>

**ChemCom* is a chemistry curriculum written for secondary school students by the American Chemical Society (ACS). It attempts to enhance science literacy by emphasizing chemistry's impact on society. It is aimed at the student who will become a citizen but not necessarily a scientist in a technological society. ChemCom takes a different approach to the learning of chemistry. Each of the eight units revolves around a societal question. This question creates a need to know chemistry to find a solution. The context of each question is a community: local, workplace, national, or global. The chemistry presented to the students builds upon the same vocabulary, thinking skills, problem solving and lab techniques as most traditional introductory chemistry courses. However in ChemCom the student is lead to integrate what they have learned to see how it addresses issues in the real world. This is accomplished through many decision-making activities that are a part of the course. It is the long-term goal of the curriculum to help students acquire the technical knowledge they need in order to make intelligent decisions for themselves and for the communities in which they belong. The program is available through the American Chemical Society; <http://portal.acs.org/portal/acs/corg/content>

NOTE: The American Chemical Society also has other resources on its website that might be useful for school science programs at both the elementary and middle school levels.

**Developmental Approaches to Science, Health and Technology (DASH)* is an integrated, sequential, comprehensive K-6 elementary science/health program brings the working worlds of technologists and scientists into elementary classrooms. Each year builds on the previous years and concepts are spiraled from year to year. The DASH program teaches students to become aware of the social impact of science and technology on their lives both in and out of school. Students leave the program with an understanding of basic concepts of the physical, biological, and earth sciences that they will need in secondary school, understanding of their own nutritional needs and biological processes, and understanding of the destructive effects of disease and drugs. In the DASH curriculum, students use kinesthetic, spatial, and visual modes of learning as well as linguistic and mathematical modes while working in cooperative communities.

DASH materials are sequential and accommodate variations in student developmental stages and concept, skill, and cognitive style differences through hands-

on, activity-based materials rooted in real-world, concrete, practical experiences. Graphic, oral, writing, lyrical, and kinesthetic - as well as reading - modes of communication are built into the program. Cooperative group projects permit peer sharing, teaching, and differential contribution. Students also conduct explanatory investigations rooted in real world application.

DASH is published by the Curriculum Research and Development Group, University of Hawaii. For more information, go to:
<http://manoa.hawaii.edu/crdg/subject/science/>

**Event-Based Science (EBS)*. Event-Based Science is a standards-based program in which newsworthy events establish the relevance of science topics; authentic tasks create the need-to-know more about those topics; and lively interviews, photographs, Web pages, and inquiry-based science activities create a desire to know more about those topics. These inquiry-based middle-school curriculum modules use readings, media reports, and role-playing as students investigate events like oil spills, epidemics, fraud, hurricanes, volcanos, and the like. For more information, visit the following web address:
<http://www.ebsinstitute.com/>

Foundational Approaches in Science Teaching (FAST)* is “a middle school general science program built on a constructivist model of instruction delivered through a sequence of laboratory experiences that enable construction of foundational concepts underpinning modern science. Content covers basic physics, chemistry, earth science, biology, astronomy, ecology, and epistemology. The program is aligned with NRC’s National Science Education Standards. Components consist of a student book, science record book, an assessment system, a program articulated resource library, and a teacher’s guide for each of three levels of FAST. A program specific professional training is required of teachers. Duration of training is approximately 40–80 hours depending upon hours per day and the use of other out-of-classroom components. For more information, contact: Science Section, The Curriculum Research & Development Group, 1776 University Avenue, UHS Building 2, Rm 202 Honolulu, HI 96822-2463; 800 799-8111. **Website: <http://www.hawaii.edu/crdg/sections/science/>

**Full Options Science System (FOSS)* is a research based K-8 curriculum program designed to meet the challenge of providing meaningful science education for all students in diverse American classrooms and to prepare them for life in the 21st century. Development of the FOSS program was, and continues to be, guided by advances in the understanding of how youngsters think and learn. Science is an active enterprise, made active by our human capacity to think. Scientific knowledge advances when scientists observe objects and events, think about how they relate to what is known, test their ideas in logical ways, and generate explanations that integrate the new information into the established order. Thus the scientific enterprise is both what we know (content) and how we come to know it (process). The best way for students to appreciate the scientific enterprise, learn important scientific concepts, and develop the ability to think critically is to actively construct ideas through their own inquiries, investigations, and analyses. The FOSS program was created to engage students in these processes as they explore the

natural world. Teachers and students do science together when they open the FOSS kits, engaging in enduring experiences that lead to deeper understanding of the natural world.

For further information about the program, go to the following website:

<http://www.fossweb.com/>

**Science Education for Public Understanding Program (SEPUP)* was developed at the Lawrence Hall of Science at the University of California, Berkeley with support from the National Science Foundation. These year-long middle- and high-school courses supply activities and materials to investigate how science and technology interact with people and the environment. SEPUP curriculum programs provide diverse educational materials that highlight science in the context of societal issues. Students experience the reality of science not only by collecting and processing scientific evidence, but also by using it to make decisions. As a result, they begin to appreciate both the power and the limitations of science. SEPUP programs provide students with extensive and varied exposure to important content and skills that give them an opportunity to use scientific inquiry and develop the ability to think and act in ways associated with inquiry and a means to understand and act on personal and social issues and develop decision-making skills.

SEPUP is manufactured, published, and distributed nationally by LAB-AIDS, Inc. (800.381.8003). **Website:** www.sepup.com

**Great Explorations in Math and Science (GEMS)* integrates science and mathematics concepts. Developed at the Lawrence Hall of Science, the public science education center at the University of California at Berkeley, and tested in thousands of classrooms nationwide, over 70 GEMS Teacher's Guides and Handbooks offer a wide range of supplementary learning experiences for preschool through 8th grade. GEMS activities engage students in direct experience and experimentation to introduce essential, standards-based principles and concepts. Clear step-by-step instructions enable all teachers to be successful presenting the activities. GEMS units offer effective, practical, economical, and schedule-friendly ways to provide high-quality science and math learning to all students. GEMS units are designed to be engaging and motivating for students. One of the central goals in the development and testing process is to maximize the interest and participation of all students. Captivating the imagination of students by challenging them is a strong emphasis of the GEMS approach.

For further information and to order materials, contact the Lawrence Hall of Science, Berkeley, CA; tel.: 510- 642-7771; Web site:

<http://lawrencehallofscience.stores.yahoo.net/greatxinmat.html>

**Physics Resources and Instructional Strategies for Motivating Students (PRISMS)* is a program for grades 10-12, blends exploratory activities, concept development, and application activities into a learning cycle. The PRISMS materials were developed and field-tested by the Iowa Physics Task Force with support from the Iowa Department of Public Instruction, the Iowa State Legislature, the U.S. Department of Education and an unsolicited gift. The Physics Resources include a guide with over 130 activities in the form of student instructions and teacher notes with background information on the activities. Several video tapes from which students make observations and take data, and recommended software and interfacing for those schools that have access to

microcomputers are also parts of the resources. A complete student evaluation and testing program is included in a 3 to 4 diskette set. The Instructional Strategies blend exploratory activities, concept development and application activities to stimulate problem-solving skills and the understanding of major physics concepts. The guide can be integrated with the use of any physics textbook and can be individualized to meet the needs of each teacher. Motivating students is accomplished with the high interest laboratory activities which relate physics to student experiences. These experiences use easily obtainable, inexpensive materials such as Hot Wheels, toy projectiles, model sailboats, bicycles, skate boards, etc. The guide also contains activities dealing with science-technology/social issues and with career information.

For more information, contact the PRISMS Project: <http://www.prisms.uni.edu/>

Competitions and Comprehensive National (International) Programs---

The International Baccalaureate Program* aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect. To this end the organization works with schools, governments and international organizations to develop challenging programs of international education and rigorous assessment. These programs encourage students across the world to become active, compassionate and lifelong learners who understand differences, can also be right. **Website: <http://www.ibo.org/>

**Future Problem Solving Program International (FPSPI)* "engages students in creative problem solving. Its mission is to "develop the ability of young people globally to design and promote positive futures using critical, creative thinking". Founded by creativity pioneer Dr. E. Paul Torrance, FPSPI stimulates critical and creative thinking skills and encourages students to develop a vision for the future. FPSPI features curricular and co-curricular competitive, as well as non-competitive, activities in creative problem solving. the Future Problem Solving Program International involves over 250,000 students annually from Australia, Canada, Hong Kong, Japan, Korea, Malaysia, New Zealand, Russia, Singapore, Great Britain and the United States.

Website: <http://www.fpspi.org/>

**Odyssey of the Mind* is an international educational program that provides creative problem-solving opportunities for students from kindergarten through college. Team members apply their creativity to solve problems that range from building mechanical devices to presenting their own interpretation of literary classics. They then bring their solutions to competition on the local, state, and World level. Thousands of teams from throughout the U.S. and from about 25 other countries participate in the program.

Website: <http://www.odysseyofthemind.com/>

**Google Science Fair* is looking for the brightest, best young scientists from around the world to submit interesting, creative projects that are relevant to the world today.

Website: <http://www.google.com/events/sciencefair/>

**National History Day (NHD)* is a highly regarded academic competition for elementary and secondary school students. Each year, more than half a million students, encouraged by thousands of teachers nationwide, participate in the NHD contest. Students choose historical topics related to a theme and conduct extensive primary and secondary research through libraries, archives, museums, oral history interviews and historic sites. After analyzing and interpreting their sources and drawing conclusions about their topics' significance in history, students present their work in original papers, websites, exhibits, performances and documentaries. These products are entered into competitions in the spring at local, state and National levels where they are evaluated by professional historians and educators. The program culminates in the Kenneth E. Behring National Contest each June held at the University of Maryland at College Park.

For more information, go to: <http://www.nationalhistoryday.org/>