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ELEMENTS

An Overview

Active Chemistry is a Standards-based, National Science Foundation funded, full-year curriculum that is being developed in association with leading educators, scientists, engineers, and institutions. Our goal is to improve the literacy of our student population in science.

Active Chemistry embraces the idea that ALL students can have success in chemistry.


Active Chemistry is strongly correlated with what we want students to know and to be able to do. It incorporates research on how people learn and what engages students intellectually.

The *Active Chemistry* Curriculum is:

- Based on a scientific inquiry approach to learning.
- Built on a problem-based learning model.
- Derived from current science education research.
- Focused on student questions and investigations.
- Centered on collaborative learning strategies.
- Supportive of cross-disciplinary and cross-curricula approaches.
- Designed with substantial teacher support and with the assistance of the American Institute of Chemical Engineers.

An Innovative and Exciting New Chemistry Curriculum

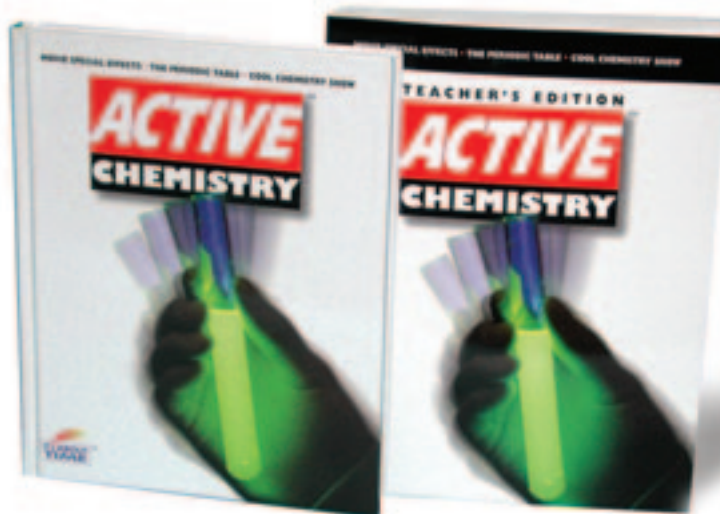
Active Chemistry will be developed in accordance with rigorous writing criteria and standards including: building the development teams, establishing a writing process, piloting with master teachers, revising, then field-testing with a cross-section of teachers from diverse backgrounds.

The curriculum will be evaluated by an independent evaluator for pedagogy, content, safety, equity and cognitive effectiveness, and revised again based on these evaluations. Another important part of the development process will include a readability study to ensure that the program is age appropriate. 

Curriculum Design

Active Chemistry follows the classroom success of *Active Physics* and is expected to be similar in style and philosophy. Using thematic challenges that engage students' interest, students learn about the impact of chemistry in a context of Arts and Leisure, Food and Drugs, Sustainability, and The Natural and Fabricated World.

Each chapter begins with a **Scenario** or a situation that places chemistry in the context of an everyday experience relevant to the students' lives. Next, students are presented with a **Chapter Challenge** involving the scenario that will capture their interest and imagination. The **Criteria** for assessing the success of the (cont.)



Chapter Challenge is determined at the beginning of each chapter and a rubric is developed with the students. Students then accumulate the knowledge needed to complete the challenge by performing activity-based **Investigations**. Students take an active role in learning by participating in hands-on labs based on scientific inquiry. Students must master the key concepts in the **Investigations** and apply their new knowledge in order to complete their challenge. Cooperative engagement is integral to the course, as students are encouraged to work together in small groups to acquire knowledge and information needed to address the challenge presented in each chapter. Each **Investigation** concludes with a **Reflecting on the Activity and the Challenge**, which relates the activity to the **Chapter Challenge**.

For example, suppose you choose to begin with the **Movie Special Effects** chapter of our current *Active Chemistry* prototype book. On the first day your students are introduced to the **Chapter Challenge**. Your *Active Chemistry* class has been invited to participate in a low-budget movie. The students have been asked to write a script for a simple scene in which they can incorporate some special effects.

To meet their challenge, students must:

- Write a script that requires a special effect or effects using one or more chemical principles.
- Provide a written procedure to the “producer” explaining how the special effect works.



- Demonstrate the special effect using acceptable safety procedures.


How can students get started? How can they complete such a challenge without the necessary chemistry knowledge? That’s what makes *Active Chemistry* unique. Students are introduced to the chemistry they can use to complete the challenge on a need-to-know basis.

Before the chapter activities begin, a discussion takes place about the **Criteria** for success.

The class discusses what is expected in an excellent presentation and how it will be graded. For instance, they may decide that the rubric for grading will include the following factors:

- the accuracy of the explanation of the chemical principles used in the special effect;
- the creativity of the script;
- the interest and appeal to the audience;
- safety considerations;
- the quality of the demonstration.

They also need to decide whether each factor carries equal weight, or if one has a greater impact. Students will have a sense of what is required for an excellent presentation before they begin. They will revisit the criteria before work on the challenge is finalized.

The second day begins with the first of nine activities. As one activity is completed, the next one starts. *Active Chemistry* is an activity-based curriculum. 



TIMELINE

Currently, the project writing teams are creating materials to be pilot tested during the 2003-2004 school year. Based on the feedback and research results from the pilot test, rewrites of the materials will be field tested during the 2004-2005 school year. Some of the teachers

participating in the pilot test and/or field test will attend a 1-week or 2-week training program during the summer preceding their involvement. Pilot test teacher training is scheduled for the week of August 11, 2003 at Montana State University in Bozeman, Montana.

- June 2002:** Orientation Meeting.
- October 2002:** First draft of 3 chapters (student edition) due from each writing team.
- February 2003:** Second draft of 3 chapters (student edition) due from each writing team. Micro-testing and critique of activities.
- June 2003:** Third draft of student edition due from each writing team. First draft of teacher guide due from each writing team.
- August 2003:** Final draft of student edition and teacher edition due. Pilot test teacher workshops.
- Sept. - Nov. 2003:** Pilot test 1.
- February 2004:** First rewrite of student and teacher edition based on pilot test results.
- March - April 2004:** Pilot test 2.
- June 2004:** Second rewrite of student and teacher edition based on pilot test results.
- August 2004:** Field test training.
- Sept. 2004 - June 2005:** Field test.
- June 2005:** Third rewrite of student and teacher edition based on field test results.
- Spring 2006:** *Active Chemistry* introduced at ACS/NSTA meetings.

It's About Time, Inc. (IAT)

As the publishers of *Active Physics*, *EarthComm*, *Investigating Earth Systems* and *MATH Connections*, all NSF funded curricula, IAT has a proven track record in dissemination and implementation of NSF research-based programs. To further support classroom inquiry, IAT developed a Material Kit Division to

build and design customized equipment kits for each curricula. IAT has also built a Professional Development and Implementation Department to focus on facilitating successful implementations of all its programs, thus demonstrating that it will go well beyond the role of the traditional publisher. ✍

How You Can Participate

- Join our mailing list
- Review materials
- Be a pilot test teacher
- Be a field test teacher

Please let us know if you are interested in any of these levels of involvement by contacting Donna McGrail: dmcgrail@its-about-time.com ✉



Together we can make a difference
For more information call toll-free at 1-888-698-TIME (8463)

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If you are currently on our mailing list and would like to be removed, please let us know by writing to dmcgrail@its-about-time.com

Development Team

Active Chemistry is being developed in association with leading educators, scientists, engineers, and institutions. Four writing teams, led by top science and chemistry educators from around the country, will work in conjunction with our Principal Investigators. In addition, the American Institute of Chemical Engineers (AIChE), as well as a prestigious Board of Advisors, will oversee the project.

AIChE is a professional association of more than 60,000 members that provides leadership in advancing the chemical engineering profession. Its members are at the forefront of research to assure the safe and environmentally sound manufacture, use, and disposal of chemical products. Their mission includes the fostering and dissemination of chemical engineering knowledge and applies the expertise of its members to address societal needs throughout the world. *Active Chemistry* is an exceptionally appropriate vehicle to meet these objectives.

“This project will create a comprehensive curriculum with an emphasis on active learning of chemical principles. Chemical engineering, in itself, is a discipline which is an implementation of active chemistry, and we are excited to contribute the expertise of our members to enhance the learning of high school students in science, math and technology... The *Active Chemistry* program fits with AIChE’s long-term vision for societal impact. I am confident that our collaboration has the necessary resources, contacts, and expertise to develop and implement a very successful program.”

— John Sofranko
Executive Director, AIChE.

Active Chemistry

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