

# **Recommendations for Selection of New Instructional Materials for:**

**Chemistry 1 Honors  
Chemistry 2 Honors**

## **Textbook request for:**

**Author:** Buthelezi, Dingrando, Hainen, Wistrom, Zike  
**Publisher:** Glencoe/McGraw-Hill  
**Copyright Date:** 2008  
**Titles:** Chemistry: Matter and Change

**Date:** March 24, 2009

# Program/Course Identification Information

(New Textbook adoption)

- **Course Name**

Chemistry 1 Honors  
Chemistry 2 Honors

- **Number of students this recommendation will impact**

Annually, based on following estimate:

- Chemistry 1 Honors
  - 4 sections of 30 students each                      120 students
  - 5-year Total    600 students
- Chemistry 2 Honors
  - 6 sections of 30 students each                      180 students
  - 5-year Total    900 students

- **Number of sections, number of teachers**

Chemistry 1 Honors:                      2 sections @ 2 sections per teacher  
Total:    1 Teacher

Chemistry 2 Honors:                      3 sections @ 3 sections per teacher  
Total:    1 Teacher

- **Textbook Information – Chemistry 1 and Physics 1**

Author:                                      Buthelezi, Dingrando, Hainen, Wistrom, Zike  
Publisher:                                      Glencoe/McGraw-Hill  
Copyright Date:                              2008  
Titles:    Chemistry: Matter and Change

- **Description of Proposed Materials**

Glencoe ***Chemistry: Matter and Change*** provides students content coverage of all the necessary components of chemistry for a higher level learner. This textbook will be used for a Chemistry 1 Honors course, which students take for one semester during their freshman year, and again for a Chemistry 2 Honors course, which students take for a semester any year thereafter.

## Materials Description

- **What needs will be met by these materials?**

These materials will provide curriculum support that matches both state and district learning targets. The textbook and supporting materials provide student and teacher lead inquiry activities, application of knowledge opportunities, incorporation and exploration of technology, methodical approaches to understanding and applying systems, and scaffolding to build in *Habits of Mind*, a model of thinking that is being incorporated into the Science Curriculum district wide. The current 1997 edition of Glencoe's *Chemistry: Concepts and Applications* does not provide the appropriate support with supplemental technology and lacks an appropriate reading level for Chemistry 2 Honors students.

- **How are these materials aligned with the EALRs and the District Targets?**

*Chemistry: Matter and Change* is a High School textbook. The text covers District Learning Targets and state EALRs for Physical Science. It is written at an appropriate level for students entering the course from any 8<sup>th</sup>/9<sup>th</sup> Grade Science Curriculum. The textbook comes with laboratory activities which can be implemented in the classroom. Each chapter in the textbook includes extensive problem sets, along with step-by-step instruction in problem-solving skills. There are also numerous on-line applications that complement each topic, which addresses district technology targets.

- **What is the content of the course/program for which these materials are proposed?**

The materials are proposed for semester long general Chemistry 1 Honors course taken during a student's 9<sup>th</sup> grade year, and a Chemistry 2 Honors course taken during a student's 10<sup>th</sup>, 11<sup>th</sup> or 12<sup>th</sup> grade year.

- **Chemistry 1 Honors Topics:**

*Classification of Matter, Properties of the Atom, the Periodic Table, Chemical Bonds, Chemical Reactions, Physical Changes of Matter, Solutions, Acids and Bases, Moles, Stoichiometry, and Nuclear Changes*

- **Chemistry 2 Honors Topics:**

*Stoichiometry/mole applications, electromagnetic radiation, quantum theory, electron configuration, advanced chemical bonding, molecular shape, Thermochemistry, Kinetic/Molecular Gas theory, Intermolecular Forces, Chemical Equilibrium, Acids/Bases.*

- **How do these materials allow students to demonstrate mastery of the Grade Level Expectations or District Targets?**

In addition to providing critical support to concepts taught in the Chemistry 1 and 2 Honors classes, the textbook comes with laboratory activities which can be implemented in the classroom. Each chapter in the textbook includes extensive problem sets, along with step-by-step instruction in problem-solving skills. There are also numerous on-line applications that complement each topic, which addresses district technology targets.

- **What is the relationship of these materials to other materials in use in the department and school?**

Chemistry 1 and 2 Honors are laboratory classes. There are several lab activities for each unit of study that can augment or replace current lab experiences. The textbook will complement hands-on activities and demonstrations performed in the classroom. Supplemental material includes Demonstration and Laboratory CD ROMS that can interface with the current technology that is already in use. The current textbook supplemental materials have very little technological interactions and the Audio Visual options are outdated and unuseful (example overheads and 3 inch floppy discs).

# Implementation and Associated Costs

- Describe the staff development/training necessary to implement these materials  
-Include a timeline for implementation

For the first year of implementation, all teachers teaching Chemistry 1 and 2 Honors will meet twice a month to discuss objectives, pacing of lessons, and to share with others what works/doesn't work. Teachers that have taught regular Chemistry 1 and Chemistry 2 Honors courses in the past will participate in these meetings to help new teachers plan appropriate time lines for each concept being developed.

A total of 2 teachers will need approximately 10 hours each of paid planning and meeting time. This is based on previous adoptions of paying each teacher 2hr/ month for 8 months for planning/meeting time.

- **Number of materials**

## Student Books

Students enrolled in Chem 1 H:	65 (2 sections per semester)
Students enrolled in Chem 2 H:	100 (3 sections per semester)
Classroom sets (2):	60
"Extra" for medical, resource, etc.:	20
Total:	245
Current no. of books:	0
Books to order:	245

- **Number and costs of supplemental/associated materials**

- Materials for 2 teachers (1 Chemistry Honors, 1 Chemistry 2 Honors)

Laboratory Manual, Student Edition (SE)	2	
Mastering Standardized Tests SE		2
Challenge Problems	2	
Standardized Test Practice Workbook		2
Study Guide and Reinforcement		2
Teacher Wraparound Edition		2
Teacher Classroom Resources		2
Teacherworks Plus CD-ROM		2
Studentworks Plus CD-ROM		2
Examview Assessment Suite CD-ROM		2
Virtual Labs CD-ROM		2

## **Annual operating expenses**

Chemistry 1 & 2 Honors Presentation - March 2009

- **What are the ongoing annual operating costs necessary to support this adoption?**

Possible operating costs will include the purchase of additional textbooks as student numbers may increase. This should be addressed on a yearly basis in preparation for incoming classes. Also, the replacement of textbooks due to damage, loss, or theft must be considered.

- **What are the sources of funding to meet the ongoing operational costs?**

Damage, loss, and theft should be addressed by students responsible for the textbooks. Sources of funding for additional textbooks would have to come from the MISF, building funds, and/or other district funds. The science department at MIHS does not have the funds for textbook purchases.

# Evaluation Process

## Criteria used to evaluate the materials:

The chemistry teachers in the science department examined a variety of high school 9<sup>th</sup> grade and 11<sup>th</sup> grade science textbooks and selected the best 2 for a more thorough evaluation by students, parents, and teachers. The books that were not formally evaluated were more appropriate for Advanced Placement Chemistry courses, or too specific for an honors 11<sup>th</sup> grade student.

There were several criteria used to evaluate the two textbooks under consideration. A district evaluation rubric for teachers was modified by the science department to include the following criteria.

## The textbook for the chemistry honors courses should:

- Address the WA State GLE's in content, skills to do scientific inquiry, and application of skills and knowledge to design solutions to human problems/challenges.
- Provide balance of content, teacher-directed inquiry, and student-led inquiry.
- Provide opportunity for students to address Habits of Mind: tenacity, skepticism, curiosity, and reflection. These habits of mind were identified by the 6-12 District Science Review Committee as the most applicable to middle and high school scientific learning.
- Address depth as well as breadth.
- Incorporate hand-on experiences, higher-level thinking skills, and activities that stimulate student participation and critical thinking.
- Foster application of course concepts and skills to the real world.
- Be at an appropriate reading level for the intended grade.
- Be supported by a variety of useful supplemental materials, including availability on CD-ROM
- Include instructional materials that support a variety of learning styles, abilities, and ELL students.
- Provide high-quality tools that encourage and support multiple methods of formal and informal assessment.
- Provide diagrams and illustrations that engage and challenge students.

- Have an organizational structure that makes sense and is teachable.
- Be visually pleasing to students, including appropriate font styles, use of color, length of chapters, photos, graphs, and highlighted concepts and vocabulary.
- Have an engaging layout that is not distracting.
- Be well-bound, durable, and portable.
- Expose students to positive examples of human diversity (socio-economic, gender, ethnicity, abilities)

**Students completed a shorter rubric that included the following criteria:**

- Clearly written text
- Informative text
- Helpful diagrams and pictures
- Helpful example problems and solutions
- Asides are relevant and clear
- Usefulness of online applications

**Results of the textbooks evaluation process:**

All four Chemistry teachers at MIHS evaluated the selection of textbooks. Prospective Chemistry 1 and 2 Honors teachers focused on the content in the textbook that were appropriate for that particular course.

In addition to the evaluation conducted by teachers, the Chemistry 1 and 2 Honors textbooks were also scrutinized by students. The following evaluation rubrics summarize the results of these evaluations.

<b>Book (Publisher)</b>	<b>Weaknesses identified by teachers</b>	<b>Weaknesses identified by students</b>
<i>Chemistry</i> (Prentice Hall)	<ul style="list-style-type: none"> <li>▪ Organization of topics lack fluidity in relation to course layout</li> <li>▪ Explanation of topics too wordy, and contain too much “fluff”</li> <li>▪ Lack of challenge in practice problems, and lack of depth into topics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sample problems not challenging, lack relevance</li> </ul>
<i>Chemistry: Matter and Change</i> (Glencoe)	<ul style="list-style-type: none"> <li>▪ The reading level of this book is difficult, 11<sup>th</sup> and 12<sup>th</sup> grade level</li> <li>▪ The depth and math concepts are possibly too advanced for Chem 1 Honors</li> </ul>	<ul style="list-style-type: none"> <li>▪ Difficult content and unfamiliar language</li> </ul>

Glencoe’s *Chemistry: Matter and Change* met the criteria used by the science teachers in all categories. Students did not rank the Glencoe text lower than a neutral in any of the criteria that they were using.

<b>Book (publisher)</b>	<b>Strengths identified by teachers</b>	<b>Strengths identified by students</b>
<i>Chemistry: Matter and Change</i> (Glencoe)	<ul style="list-style-type: none"> <li>▪ Organization of topics was a huge strength of this text</li> <li>▪ Concepts were clear, and practice problems were challenging and relevant</li> <li>▪ Covers all the content required by the district and state</li> <li>▪ Covers all the possible content needed in these courses</li> </ul>	<ul style="list-style-type: none"> <li>▪ Rated book highest in organizational category.</li> <li>▪ Rated book highest in challenge and depth of content</li> <li>▪ Rated book highest in diagrams and sample problems</li> </ul>

#### 14. Evaluation of materials and student outcomes if materials are adopted:

Chemistry 1 Honors is a new courses starting in the 2009-2010 school year. Therefore, we will not have any past data to compare student achievement in the new course. For Chemistry 2 Honors, the students will experience a more organized and fluid approach as they work towards concept mastery. New textbooks also encourage a greater use of the books as a resource outside of the classroom, and will motivate students to pursue deeper understandings via independent reading.