

ALEKS Math Assessment

By David L. Johnson

All math teachers face the challenge of responding to students individually in the classroom, assessing each student's skills, and providing skill-appropriate practice and feedback. Of course, this is nearly impossible without a technology tool such as ALEKS (Assessment and Learning in Knowledge Spaces), a math program for students and assessment management program for teachers. Developed from knowledge space theory, ALEKS can accurately assess the exact knowledge state of students in any mathematics subject area, guide them in the selection of new materials, and record their progress toward mastery of the content.

A *knowledge space* is a collection of specific topic items in a knowledge domain. A *knowledge state* is the list of topics the student has learned. The possible knowledge state combinations of 100 to 300 topics in a domain such as Middle School Math 2 is extremely large, so the challenge is to



One of about 20 assessment questions students must answer before beginning the Middle School Math 2 module

determine the next step for a student that will generate a high likelihood of success. In knowledge space theory, this new knowledge state is called the *outer fringe*. It is identical to the old knowledge state but contains exactly one new item. ALEKS employs a guidance system that helps students move to the outer fringe.

Students log in online and begin a module by taking an assessment. Every assessment is unique; a student can't predict the sequence of questions or learn the answers ahead of time. Assessment questions ensure comprehensive coverage of the subject, and the system selects each sub-

sequent question based on the answers to all previous questions. There are no multiple choice questions, thus preventing the student from inducing an answer from the choices given. ALEKS's artificial intelligence engine won't let students "game the system."

Once the assessment is concluded, the student may begin a topic. ALEKS corrects and analyzes mistakes and offers specific advice for particular problems. An "Explain" button offers guidance and access to an online hyperlinked dictionary. ALEKS continually monitors and updates its map

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of the student's knowledge. Once students demonstrate mastery of a concept, they advance to the next topic.

ALEKS offers a Teacher Module that enables teachers to plan lessons after gauging each student's achievement. The module generates summaries for individual students and for the entire class, permitting the teacher to choose topics the class is most ready to learn. ALEKS is delivered online, is accessible from anywhere at any time, and works with Windows- and Macintosh-compatible personal computers.

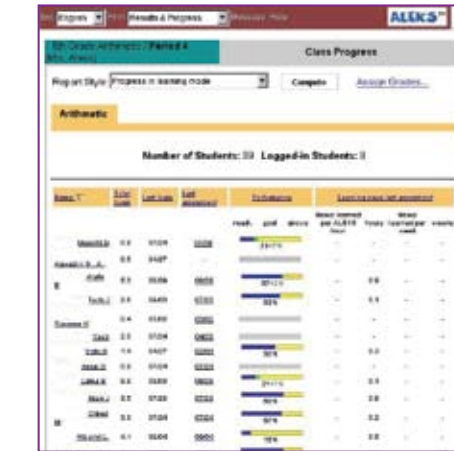
Although the program's graphics may lack the pizzazz of other software packages, and it is difficult to go back and review problems once a session is completed, ALEKS does provide an effective means to address student needs at all ability levels and to provide formative assessment, feedback, and problem selection tailored to each student.

ALEKS Corporation

15641 Red Hill Avenue, Suite 150
Tustin, CA 92780
<http://www.aleks.com/>
Price: 3-month subscription, per student \$25;
12-month, \$40

Modules offered:

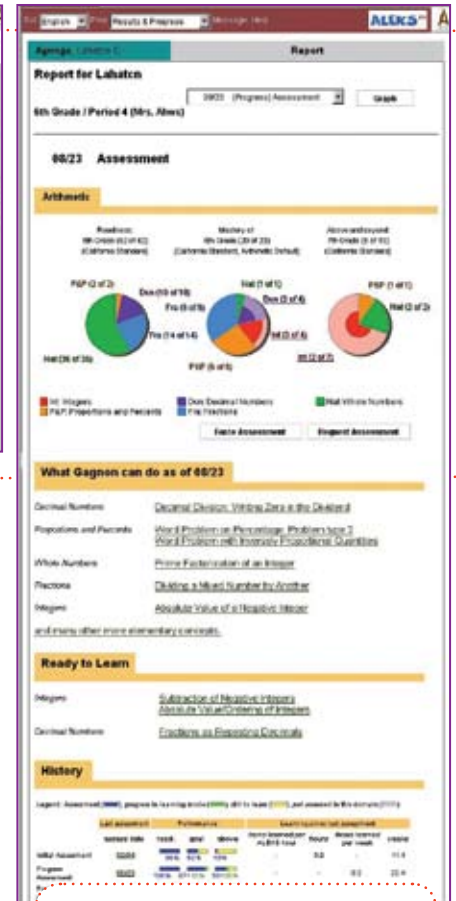
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Figures 2 and 3. A teacher class summary, and teacher summary for an individual student.