

## 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

The screenshot shows the ALEKS interface for a math assessment. At the top, there's a navigation bar with 'ALEKS' logo, 'HELP', 'WORKSHEET', 'INBOX', 'OPTIONS', 'English', and 'EXIT'. Below that, a secondary bar contains 'MyPie', 'Review', 'Dictionary', 'Calculator', 'Quiz', and 'M.S. Math 2'. The main content area displays 'Question #7' and an 'Assessment Progress' indicator. The problem is 'Multiply. Write your answer as a fraction in simplest form.' followed by the equation  $-\frac{5}{6} \times (-2) \times \frac{1}{7}$ . Below the equation is an empty input field and three buttons: 'Clear', 'Undo', and 'Help'. At the bottom, there are 'Next >>' and 'I haven't learned this yet' buttons.

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

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

PRODUCTS & SERVICES

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**

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7th Grade Math 108 / Middle School Math Course 2  
Individual learning progress since latest assessment

Download Excel Spreadsheet

Middle School Math Course 2

Number of Students: 29 Logged-in Students: 0

Student ID	Total Score (ALEKS)	Last Assessment	Last Assessment Date	Performance	Current Learning Rate (Correctly Identified)	Estimated Time to Master	Time Spent (hours:min)	Time Spent (days:min)	Time Spent (weeks:min)
Adrian, C.	62.1	02/05/2008	02/18/2008	68.0%	2.1	19.8	8.5	2.4	
Bull, J.	38.8	02/09/2008	02/02/2008	53.0%	1.7	11.1	19.0	1.0	
Carmichael, C.	34.5	02/03/2008	02/02/2008	49.0%	1.7	11.1	-	8.1	
Carmichael, C.	65.8	02/29/2008	02/28/2008	79.0%	1.3	17.3	-	0.1	
Collins, J.	45.7	02/02/2008	02/28/2008	64.0%	1.2	19.2	-	0.4	
Conroy, D.	66.8	02/05/2008	02/28/2008	81.0%	1.7	12.6	24.5	0.9	
Conroy, J.	37.1	02/08/2008	02/02/2008	38.0%	1.7	13.4	26.8	0.9	
Daniel, B.	83.0	02/03/2008	02/28/2008	88.0%	1.9	11.4	-	0.8	
Green, S.	38.7	02/07/2008	02/02/2008	46.0%	1.4	13.6	26.8	0.7	
Green, M.	18.1	02/02/2008	02/28/2008	8.0%	1.3	14.2	28.8	0.7	
Hart, K.	67.4	02/08/2008	02/02/2008	79.0%	1.2	18.8	26.8	0.9	

**Modules Offered:**

- Mathematics LV 3-5 (with QuickTables)
- Mathematics LV 6
- Essential Mathematics (with QuickTables)
- QuickTables
- Middle School Geometry
- Middle School Math 1
- Middle School Math 2
- Middle School Math 3
- Pre-Algebra
- Foundations of High School Math
- Algebra 1
- High School Geometry
- Algebra 2
- PreCalculus
- Trigonometry
- Math Prep for CA High School Exit Exam
- Math Prep for TAKS -- High School Exit Exam
- AP Statistics (Quantitative)
- Math Review for AP Calculus
- Math Review for AP Physics
- Chemistry
- Fundamentals of Accounting (Sole Proprietorship)
- Fundamentals of Accounting (Corporation)
- Business Math

7th Grade Math 108 / Middle School Math Course 2  
Report for Smith, Jill E.

02/06/2008 Learning

Last login: 02/06/2008 From host: mypc.mycollge.edu  
Enroll date: 01/06/2008 Hours/week: 8.8 (4.3 from school)  
Total Hours: 38 hours 54 minutes (19 hours 2 minutes from school)

Middle School Math Course 2

MyPie

Mastery of 7th Grade (208 of 268)  
Geometry (45 of 52) Fractions (28 of 36)  
Algebra (17 of 51) Integers (48 of 40)  
Measurement & Graphs (23 of 40)

Legend:  
Algebra: Algebra  
Geometry: Geometry  
Decimals: Decimals and Percents  
Fractions: Fractions and Proportions  
Integers: Whole Numbers and Integers  
Measurement & Graphs: Measurement, Graphs, and Probability

Jill's State Standards Report

View California's Mathematics Content Standards report

What Jill can do

- Whole Numbers and Integers
- Factors and Prime Numbers
- Word problem with common multiples
- Fractions and Proportions
- Equivalent Fractions
- Introduction to ratios
- Operations with Fractions
- Fractional part of a circle
- Word problem with fractions
- Mixed Numbers
- Mixed number multiplication: Problem type 2
- Signed Fractions and Exponents
- Signed fraction multiplication
- Exponents and order of operations
- Proportions
- Solving a proportion: Basic

What Jill is ready to learn next

- Fractions and Proportions
- Mixed Numbers
- Mixed number division
- Signed Fractions and Exponents
- Signed fraction addition
- Proportions
- Word problem on proportions: Problem type 1
- Decimals and Percents
- Conversion between Fractions and Decimals
- Converting a fraction to a repeating decimal
- Percents
- Connecting between percentages and decimals
- Writing a ratio as a percentage

History

Assessment	Last assessment	Assessment performance	Goal	Score	Time to completion (hrs:min)	Correct answers	Time to master (hrs:min)	Estimated time to reach the goal
Standard Assessment 1	02/02/2008	79.0%	80.0%	8	1.4	14	1.4	1.4
Progress Assessment	02/14/2008	64.0%	80.0%	4.4	1.7	79.2	17.2	17.2
Initial Assessment								

A class summary and an individual student summary are two reports available to teachers.



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