ALEKS®: Your Mathematics Solution

ALEKS® (Assessment and LEarning in Knowledge Spaces) is a research-based, artificially-intelligent learning and assessment program that provides students with a completely personalized, self-paced learning experience. ALEKS’s artificial intelligence knows, at each moment, the exact topics a student has mastered, not mastered, and, most importantly, is ready to learn. By providing students with targeted, individualized instruction on the exact topics they are ready to learn, ALEKS facilitates a maximally efficient and effective learning and teaching experience.

ALEKS is accessible 24/7 from almost any PC or Mac computer with internet access; a selection of courses is also available on the iPad, Android Tablet, and Chromebook. ALEKS is sold on a subscription basis, with prices for subscription lengths and products varying with different markets and with no minimum purchases or additional fees. A subscription gives a student access to a large course library.

Why ALEKS is Unique

ALEKS works fundamentally on the ideas that:

1) Students have wide and varying gaps in math knowledge and learn at different speeds;
2) Students engaged in active (not passive) learning (e.g., solving problems instead of watching someone else solve problems) are more likely to learn and retain information; and
3) Finding out what a student knows and does not know and then providing targeted instruction to a student’s zone of proximal development¹ (or, what she is ready to learn) is one of the keys to effective and efficient learning and instruction.

The unique and proprietary ALEKS artificial intelligence (AI) is the main feature that sets ALEKS course products apart from other “adaptive” technologies. The AI maps the detail of each student’s knowledge, which allows it to then know, at each moment, what a student knows, does not know, and, most importantly, is ready to learn. ALEKS creates personalized learning paths by presenting only a student’s Ready to Learn Topics, and therefore, adapts to each student’s precise educational needs. As a student works in ALEKS, the AI continuously updates and optimizes its understanding of the student’s knowledge and adjusts the student’s learning paths accordingly.

This is the distinctive benefit totally unique to ALEKS’ Artificial Intelligence and its adaptive capabilities. Since the ALEKS AI tailors instruction so precisely and reliably to each student’s optimal learning zone, students have a high degree of success with ALEKS. Our data show that students will correctly answer a Ready to Learn Topic more than 90% of the time. Instead of teaching in a one-size-fits-all approach that makes students bored, frustrated, or confused, ALEKS adapts to each student’s individual educational needs, accelerating a student’s learning momentum and making learning more efficient and effective. No other company provides an educational product that delivers instruction on the topics that the student is precisely ready to learn.

ALEKS is Research-Based and Proven

ALEKS technologies are derived from research in Knowledge Space Theory. The research behind ALEKS is discussed in “The Assessment of Knowledge in Theory and in Practice,” available at http://www.aleks.com/about_aleks/research_behind. Since 1999, ALEKS has been used successfully by millions of students in the US and abroad from the third grade through higher education in mathematics, science, and business.

How ALEKS Works

When students first log in to ALEKS, they are given a brief interactive tutorial on how to use the ALEKS Answer Editor and the tools. Students are given flexible and easy-to-use answer tools that mimic paper and pencil to input their responses. ALEKS requires an Answer Editor because most of ALEKS problems are open-ended (rather than multiple choice) questions that require the student to provide authentic input. Because ALEKS questions require a free response, the inferences ALEKS makes about a student’s course knowledge are far more reliable than those achieved using a multiple-choice format. ALEKS is getting a true picture of the student’s actual knowledge.

In ALEKS, the lucky guesses common with multiple-choice questioning are virtually non-existent. Students must solve the problem; they cannot merely try out different proposed solutions until they find the correct answer. Also, due to the algorithmic nature of the material in ALEKS, each problem type has an extremely large, and in many cases, unlimited, number of instances with randomized numerical values and problem parameters. Therefore, students can neither predict the questions asked nor cheat because no two students will receive the exact same question.

The ALEKS Initial Assessment

After completing the Answer Editor tutorial, students then take an ALEKS Initial Assessment for the course in which they are enrolled. Through the ALEKS Initial Assessment, the system identifies students’ individual knowledge states at that point in time, that is, what students know, do not know, and, most importantly, what students are ready to learn. With this comprehensive picture of students’ individual knowledge states, ALEKS then configures a learning path that will teach the topics students are ready to learn.

The ALEKS Initial Assessment is different for every student. The assessment is adaptive, meaning that ALEKS will change the path of the assessment based on students’ answers. The questions in the assessment are algorithmically-generated, and therefore each question is a unique instance each time, for every student. The adaptive nature of the assessment combined with the algorithmic-generation of each question makes the ALEKS Initial Assessment completely individualized to each student. By individualizing the assessment, ALEKS ensures that it can deduce students’ precise knowledge states.

The ALEKS Pie

In ALEKS, a student’s knowledge state is represented by a multicolor pie chart known as the ALEKS Pie. In the ALEKS Pie, each slice corresponds to a particular area of the course (for example, “whole numbers” or “geometry”). The degree to which each slice is filled by a darker color shows the extent to which the student has mastered that particular area of the course. Each slice of the Pie may be opened to produce a list of Ready to Learn topics. Students can choose to work on any topic that ALEKS considers they are ready-to-learn. ALEKS places the responsibility of learning in the hands of
students and provides an appropriate amount of support. Students work at their own speed and are actively learning—solving problems and filling their pie charts—all of which build their confidence and learning momentum.

The Learning Mode
Learning in ALEKS is student-centric and system-led. A student starts the Learning Mode by selecting a Ready to Learn Topic from her ALEKS Pie. ALEKS then offers problems to teach the topic selected. These problems are algorithmically-generated and are, therefore, different enough that students must understand the core principles defining the topics to answer the problems correctly.

When a student is working on a particular problem, she can access an explanation by clicking on the "Explain" button. The explanation provides a step-by-step solution to the exact problem that a student is working on, with commentary. In some cases, an alternative or more detailed explanation is also available. Mathematical terms in the explanation are linked to the ALEKS Dictionary so that students can easily access the definition, understand the concept, and build their mathematical vocabulary.

The ALEKS system has sophisticated answer processing, enabling real-time AI evaluation of student answers. Students receive immediate feedback and, in some cases, suggestions for correcting mistakes. After reading the explanation(s), a student may return to “Practice”. The new problem instance offered will challenge the student to use the core principle they recently learned in the explanation. ALEKS does not encourage rote memorization of problems. Students must fully understand a topic (and therefore, the different problem variations representing that topic) before the system recognizes that they have learned it.

After reading the explanation, if a student still cannot answer correctly, she can access an explanation to the new problem, and re-learn the concept. After she answers multiple instances of the same topic correctly (generally two or three more), ALEKS determines that the student has learned the topic and adds the topic to the student’s Pie. The student then moves to a new topic. ALEKS gets to know each student based on their responses to ALEKS problems, and continuously updates the student’s knowledge state (as represented by the ALEKS Pie) with each response.

In the Learning Mode, students have a sense of responsibility for and control over their own learning. Since students can see their progress, they build math confidence and self-esteem and are motivated to continue learning. As students begin actively solving problems, their learning retention improves. Because the artificial intelligence in ALEKS targets instruction so effectively and reliably, students are highly successful at learning in ALEKS.

ALEKS Learning and Assessment Mastery Cycle
Studies have shown that assessing students on material previously learned functions to more effectively and permanently store the material in students’ long-term memory. As a mastery-based program, ALEKS has developed a cycle of learning and assessment that ensures students truly master course content. Throughout an ALEKS course, the student periodically completes ALEKS progress

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assessments—approximately 25-question, artificial-intelligence-driven assessments that employ the ALEKS adaptive assessment technology. ALEKS progress assessments focus on topics that students have recently learned. ALEKS uses the results of progress assessments to adjust the system’s detailed map of students’ knowledge of the course.

In other words, since students do not normally retain 100% of the material they learn, ALEKS progress assessments serve to identify the topics students have mastered and the topics students did not retain, and then revises their personalized learning path to include a review of the topics they did not master. Because ALEKS requires students to periodically and actively demonstrate mastery of material through mixed-question assessments, learning in an ALEKS course results in true mastery of the subject matter. Progress assessments, by default, are automatically scheduled; however, educators can also schedule either progress or comprehensive assessments at any time during the course if the educator wants to ensure students are learning the course material.

The cycle of individualized assessment and adaptive learning continues throughout the course to ensure that the student has truly mastered and retained the concepts presented. Near the end of a course, educators can elect for students to complete a comprehensive assessment for the course. Unlike a progress assessment, which tests recently learned material, the comprehensive assessment tests mastery of material in the entire course. If students complete a comprehensive assessment and show mastery of all topics, they will fill their entire ALEKS Pie and reach 100% mastery of the course. At the conclusion of each ALEKS course, students have a deeper understanding of the material and have dramatically improved mastery of the course topics.

**Building Math Fact Fluency: ALEKS QuickTables**

ALEKS QuickTables, a research-based, math fact mastery program for multiplication, division, addition, and subtraction for grades 3 and up, is an excellent tool for building students’ math fact and computational fluency. The state-of-the-art technology and proven learning strategies employed by the program accurately assesses the skill level of each student and provides individually targeted math fact practice, while motivating students with challenging and fun skill-based games. Additionally, educators can monitor student progress, generate customized worksheets, and adjust program settings to best fit student and class needs. The program is complimentary with the purchase of subscriptions to any ALEKS mathematics course or can be used by itself to help students master basic math facts and build early math literacy.

**ALEKS Reporting Features**

ALEKS makes a plethora of detailed information available in real time to every educator and administrator at all levels – from the district to the class to the individual student. Virtually all progress reports, diagnostic analyses of individual students and groups, and other learning management information are instantaneously available to educators and administrators (and, where appropriate, parents). Individual learners may also view reports of their own progress at all times. Progress can be evaluated relative to the curriculum, Common Core State Standards, and individual state standards. Through ALEKS Reporting, educators have accurate, instructionally-actionable data to target and adapt instruction, in response to student’s academic needs.
Progress Bar Report
Using this report, educators can view class and individual student progress based on assessments and work in the Learning Mode at various time intervals. The report can produce several different groupings of progress history data. Once students complete their Initial Assessment, educators can use the “Learning Progress Since Latest Assessment” data to verify that students are placed in the proper course. If a student scores less than 15% on the Initial Assessment, we recommend moving the student to a less challenging course. If a student scores over 85% on the Initial Assessment, we recommend moving the student to a more challenging course.

ALEKS Pie Report
The ALEKS Pie Report provides both a visual representation of the average class learning and lists, for each Pie Slice, the names of the students who have mastered, not mastered, and are currently ready to learn each ALEKS topic. This information allows an educator to tailor lesson plans more closely to what students are most ready to learn. Using this report, educators can find a topic that a large percentage of students are ready to learn and the exact names of the students ready to learn that topic.

ALEKS Pie Report for an Individual Student
The individual student view of the ALEKS Pie Report shows progress data for a single student in the class. The report shows the date of the student’s last login, total hours spent in the course, and the average number of hours spent working in ALEKS per week. The student’s pie chart is displayed, and each slice reveals the student’s Ready to Learn topics. The student’s “Standards Report” is available (if applicable to the course), as well as a list of all the topics the student has mastered and is ready to learn.

An individual student’s ALEKS Pie Report is one way to share student progress with parents and other education professionals who have a vested interest in the student’s progress. The information in this report can be used to easily create and maintain comprehensive individualized education plans (IEPs) and guide effective one-on-one instruction.

State Standards Report
The State Standards report allows an educator to view her classroom’s level of mastery within state standards or Common Core State Standards. Educators can view the overall percentage of students who have mastered each standard and the ALEKS topics that correspond to each standard. Educators can also view the Standards Report by student. The educator can also click on each student’s percentage mastery to view which standards that specific student has mastered and has not yet mastered.

Time and Topic Report
The Time and Topic Report allows educators to view the amount of time spent by each student in ALEKS on a daily basis and provides a detailed log of ALEKS topics attempted and mastered. Educators can select a specific student and see a detailed report of that student’s time spent in ALEKS. Educators can use this report to monitor students’ activity in ALEKS and then work one-on-one with a student on any topics that the student attempted but did not master. For educators who grade students based on the time spent in ALEKS, this report will provide the necessary information to quickly gauge which students are meeting the total time requirement and those who are not. The educator can quickly
select those students not meeting the requirement and send a reminder message to them through the ALEKS Messaging Center.

District-Level Reports
District-level reports combine all school-level reports from around the district and can be viewed in two formats—by schools or by grade levels. One of these reports, the Average Progress Report (APR) is available to ALEKS school administrators. This report allows administrators to run data for student mathematics achievement and also compare class performance for any time interval, beginning with a 6-month minimum. The APR Report provides a comprehensive overview of student and class performance, and is just one of the many robust reports available to help monitor dramatic learning outcomes achieved with ALEKS.

Summary
ALEKS relies on millions of data points collected by the ALEKS system to continually update students’ knowledge states, and re-optimize students’ individual learning paths. While there are some static assessment tools (like a “standardized test” or state-mandated exit exam) that can attach a number to course knowledge at a particular point in time, these instruments cannot uncover precisely what students know and what they are ready to learn. Traditional homework assignments are not “intelligent”—they follow a pre-established curriculum regardless of the student’s level of understanding.

Students learn best in environments where instruction is targeted their individual needs and where they are actively engaged in learning. ALEKS achieves better learning outcomes by using artificially-intelligent, adaptive assessments, combined with a dynamic learning process that meets the exact needs of each student, targets and fills gaps in knowledge, and provides a completely individualized and optimized learning path. As a result, ALEKS students are much more motivated, have a deeper level of understanding of course material, and a greater degree of success.

To access a Free Trial of the ALEKS Student and Teacher Modules, please visit http://www.aleks.com/free_trial/instructor.
The following are included with the purchase of an ALEKS subscription:

**Technical and General Customer Support**
ALEKS Corporation is committed to providing our customers with quick, efficient, and professional service. Our highly-trained Customer Support Specialists can answer any general or technical question you may have about ALEKS. An ALEKS Customer Support Specialist is available by phone at (714) 619-7090 on Sunday from 4:00PM to 1:00AM, Monday through Thursday from 7:00AM to 1:00AM, and Friday from 7:00AM to 9:00PM. All hours are in Eastern Time. Additionally, questions and requests may be submitted 24/7/365 online at [http://www.support.aleks.com](http://www.support.aleks.com).

**Product Updates and Upgrades**
ALEKS is fully maintained and regularly updated at the server level. Most updates are minor and unobtrusive to customers. For major updates, including new product releases and significant upgrades to features, customers usually have up to two years to upgrade. Updates and upgrades are included with the purchase of subscriptions and are available at the time of delivery to every customer with a current, active subscription.

**Access to the ALEKS K-12 Course Library**
The purchase of any regular subscription length will give a student access to the ALEKS K-12 course library. A student can move to and from any ALEKS course (except AP courses) in the ALEKS K-12 course library as is necessary or desirable, as long as the student’s subscription is still active.

**ALEKS QuickTables**
ALEKS QuickTables is a research-based, math fact mastery program for multiplication division, addition, and subtraction. The program is included with all ALEKS mathematics courses, and access can be enabled easily by an instructor or administrator. ALEKS QuickTables can also be purchased as a stand-alone product.

**Subscription Banking**
ALEKS subscriptions **never** expire. California school districts may opt to purchase subscriptions and “bank” them for future use. Subscriptions are not activated until the student assigned the subscription logs into ALEKS for the first time.

**ALEKS Moves with the Student from School to School**
Once a student is assigned a subscription, the subscription belongs to the student. Therefore, ALEKS subscriptions are transferrable **with a student** within a district. Students who move to another school in the same district during the school year can take their ALEKS subscriptions with them (this decision is up to the district). ALEKS Customer Support will move a student’s account to his new school and class. **Please note that subscriptions that have been used by a student cannot be reassigned to another student.**

**Subscription Replacement**
If a student on a 5-month, 7-month, 40-week, or 12-month subscription uses ALEKS for less than one month and then leaves the district, ALEKS Corporation, upon request to ALEKS Customer Support within one month of the student’s departure, will replace that used subscription with a new one of the same length.

**Teacher and Administrator Accounts**
All teacher and administrator accounts are complimentary with the purchase of student subscriptions. ALEKS Corporation will provide as many teacher and administrator accounts as needed.
With the complimentary teacher or administrator account, an educator receives access to the following additional resources:

**Student Account**
Teachers using ALEKS with students receive their own complimentary student account that can be used for online, continuous mathematics learning as a component of their professional development. ALEKS can be used to assist teachers in adding higher-level courses to their teaching portfolios or as part of their preparation for mathematics certification tests.

**ALEKS Training Center**
Teachers can visit the ALEKS Training Center for unlimited “anytime/anywhere” access to free, pre-recorded tutorials, and also join complimentary, daily webinar training sessions hosted by an ALEKS Certified Trainer. To view the schedule of trainings and to sign up, please go to [http://www.aleks.com/k12/training_center](http://www.aleks.com/k12/training_center).

**Implementation Strategies Database**
Teachers can learn more about how other educators have successfully implemented ALEKS to achieve dramatic learning outcomes by visiting the ALEKS Implementation Strategies Database. Teachers can quickly search the database by grade level, computer scenario, student purpose, state, or keyword. Teachers and administrators can also submit their own successful implementations of ALEKS for considered inclusion in the Implementation Strategies Database. To read more implementation strategies, please go to [http://www.aleks.com/k12/implementations](http://www.aleks.com/k12/implementations).

**ALEKS Community**
On this interactive forum, teachers can share their experiences with ALEKS, answer each other’s questions, share strategies, tips, and information on teaching with ALEKS. Login with your ALEKS login name and password at [http://www.aleks.com/k12/community](http://www.aleks.com/k12/community).

**ALEKS Online Professional Development**
Additional online professional development from ALEKS Corporation is available to all ALEKS customers on an ongoing basis. There is no charge for an initial ALEKS customized online professional development session. Most of our customers find that a combination of free daily webinars and the free online sessions are enough for teachers to get started on ALEKS.
System Requirements

LV3-LV6, Essential Math, and QuickTables

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<th>PC</th>
<th>Macintosh</th>
<th>iPad</th>
<th>Android Tablet*</th>
<th>Chromebook</th>
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<tr>
<td>Operating System</td>
<td>Windows</td>
<td>MacOS 10.4+</td>
<td>iOS 6+</td>
<td>Android 4+</td>
<td>ChromeOS</td>
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<tr>
<td>Browsers</td>
<td>Explorer 7.0+, Firefox 10+, Chrome</td>
<td>Safari 4+, Firefox 10+, Chrome</td>
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<td>Minimum Screen</td>
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No Java or ALEKS plug-in necessary.

* Android based devices have wide ranges of performance and form factors. At this time, the only Android based devices that ALEKS has been tested are Samsung Galaxy tablets.

All other Elementary and Middle School course products, High School Preparation for Algebra 1, Foundations of High School Math, Math Intervention, Prep for IN Algebra 1 ECA, Prep for LA Algebra 1 EOC Assessment, Prep for PA Algebra 1 Keystone Exam, Prep for TX - STAAR Algebra 1, Prep for MN Mathematics GRAD, Prep for SC Algebra 1 EOC Examination, Math for College Readiness, Math for College Success, and Prep for GED Mathematics

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All other High School and Specialized course products

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<td>Browsers</td>
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Java and the ALEKS plug-in must be installed.

** Except for Chemistry which requires 1024 x 768