LGL Edge Technical Manual
ELA/Reading & Mathematics

Executive Summary..... 4
Overview of LGL Mathematics Edge and ELA/Reading Edge..... 6
Special Education/IEP Support..... 7
Progress Monitoring..... 8
Figure 1: LGL SPED Progress Monitoring Process..... 9
LGL's Assessment-Instruction Educational Model..... 10
Figure 2: A-I Model..... 10
Figure 3: Operational A-I Model..... 10
LGL Online Diagnostics: The Key to Creating Individualized Instructional Paths..... 11
Let's Go Learn's Reading Diagnostic: DORA..... 12
Let's Go Learn's Math Diagnostics..... 15
Let's Go Learn's Special Education Assessment Tools..... 18
Figure 4: Sample Diagnostic Data Report..... 19
Setting Annual Goals and Short Term Objectives..... 19
Figure 5: IEP Goal Writer..... 20
Figure 6: Assessment-Instruction Cycle..... 21
Edge Research Base..... 22
Universal Design for Learning (UDL)..... 22
LGL Connections to UDL..... 23
Specially Designed Instruction (SDI)/Universal Design for Learning (UDL)..... 25
Connections to SDI..... 26
Reduced Cognitive Load..... 26
Connections to Reduced Cognitive Load..... 27
Culturally Relevant Context..... 28
Connections to Cultural Relevance..... 29
Music and the Brain..... 29
Connections to Music..... 30
Narrative Rate and Prosody..... 30
Connections to Narrative Rate and Prosody..... 31
Multiple Modes of Learning and Thinking..... 31
Connections to Multiple Modes of Learning..... 31
Gamification Supports Interactivity, Repeatability, Scoring, and Rewards..... 32
Connections to Gamification..... 32

LGL Product Research..... 33
Quality of Product Research..... 34
Future Research..... 36
LGL Edge Product Implementation..... 37
Implementation Integration..... 37
Prior to Instruction: One hour to complete assessment..... 37
Direct Instruction (Regular Instructor)..... 37
Small-group Instruction..... 37
Direct Instruction (Special Educators)..... 38
Cooperative Learning Groups and Activities..... 38
Best Practices for Fidelity..... 38
LGL Customer Support..... 40
Planning Implementation..... 40
Building a Professional Development Schedule..... 40
Quarterly Reviews..... 40
References..... 41
Product Effectiveness..... 42
Case Studies..... 42
Case Study 1: Downey Unified School District, Sussman Middle School..... 42
Case Study 2: Montebello ELA and Math..... 42
Case Study 3: San Bernardino City Unified School District..... 42
Third-Party Research..... 43
An Early Investigation of the Let's Go Learn Edge Program: Analyzing Program Impact after an Initial Implementation Year..... 43
The Impact of Adaptive Learning on Mathematics Achievement..... 43
Appendix A: Reference Lists..... 44
Evidence-based Resources..... 44
Product Design Resources..... 45
Special Education Resources..... 50
LGL Math References..... 51
LGL ELA/Reading References..... 53
Appendix B: Retrievable Links to Evidence of Efficacy..... 57
Case Study 1: Downey Unified School District, Sussman Middle School..... 57
Case Study 2: Montebello ELA and Math..... 57
Case Study 3: San Bernardino City Unified School District..... 57
An Early Investigation of the Let's Go Learn Edge Program: Analyzing Program Impact after an Initial Implementation Year..... 57

The Impact of Adaptive Learning on Mathematics Achievement..... 57
Appendix C: Technical Requirements..... 58
Network/Bandwidth Requirements (School/District Use Only)..... 58
Infrastructure Changes: Operation Platforms..... 59
Appendix D: Special Education Accessibility Features..... 60
Built-in Features..... 60
DORA and ADAM Diagnostic Assessments..... 60
ADAM Assessment..... 60
Device Built-in Accessibility..... 61
Built-in Accessibility..... 61
Accommodations via Assessment Proctor..... 62
DORA Assessment Accommodations..... 62
● High-frequency sub-test..... 62
● Word recognition sub-test..... 62
● Phonics sub-test..... 63
● Phonemic awareness sub-test..... 63
● Spelling sub-test..... 63
● Word meaning sub-test..... 63
● Silent reading sub-test..... 64
ADAM & DOMA Assessment Accommodations..... 64
● Math Questions..... 64

Executive Summary

Let's Go Learn (LGL) provides schools with *Math Edge* and *ELA/Reading Edge* programs – dynamic gap-driven, supplemental programs designed to meet the needs of all students. With over 20 years of successful experience in K-12 districts and schools, *Edge* programs demonstrate ample evidence of equitable impact on student achievement in reading and math.

What makes our *Edge* programs work when others fail?

- **We start with an online granular diagnostic aligned to national and state standards**. It's the same place that effective teaching and learning always start. "Educators that administer an assessment before instruction are better equipped to know where students are in relation to the desired course outcomes" (Thompson, 2021).
- **We measure "present levels" versus grade-level instructional goals.** Then our AI system creates individualized learning paths that are at each student's zone of proximal development in the specific content gap.
- **We provide formative assessments that measure progress and adapt learning paths**. This ensures ongoing progress on benchmarks and annual goals.
- **We save, track, and report student data.** Teachers can seamlessly review visual and text reports and adjust classroom, small group, or individual instruction. Our parent reports in Spanish and English provide insights in plain language and visuals with tips for home support.

How our *Edge* programs support K-12 Core Instructional Programs

The Nation's Report Card indicates that only 33% of 4th graders and 31% of 8th graders read at or above proficient levels. Similarly, 33% of 4th graders and 26% of 8th graders are at or above proficient levels in mathematics (NAEP, 2022). A majority of students in schools struggle with the reading and math skills required at their grade levels. It's critical to our success as a nation, as a diverse society, and as citizens that we transform our educational institutions and lead students to proficiency at an accelerated rate.

LGL Edge provides gap-driven, supplemental instruction that results in effective intervention, particularly for traditionally underserved students, students with disabilities, and students left

behind by pandemic interruptions. To accelerate student progress, our programs begin with granular diagnostic assessments that create learning paths customized to address student gaps and leverage student strengths. Assessments and instruction are aligned to state and national standards and follow evidence-based best practices.

Our *Edge* program design has its foundation in a combination of evidence-based research and an ongoing evaluation of student *Edge* data with teacher feedback. This combination ensures that the impact of student time-on-task is ongoing and accelerated achievement.

LGL Edge supports core mathematics and ELA/reading instructional programs in a variety of ways, including the following:

Differentiated Instruction:

- *LGL Edge* SDI instructional materials support diverse learning styles and abilities. This helps teachers differentiate instruction to meet the individual needs of students, ensuring that each student receives the support they require.

Remediation and Enrichment:

- For students who may need extra help, *LGL Edge* offers interventions to address specific learning gaps.

Personalized Learning:

- The *LGL Edge* platform leverages technology to provide personalized learning experiences that adapt to individual student progress, allowing each student to work at their own pace and focus on areas where they need improvement.

Engagement and Motivation:

- *LGL Edge* design incorporates interactive and engaging elements, including gamification, music, animation, and video. These elements capture students' interest and motivation, making the learning experience more enjoyable and effective.

Extended Learning Opportunities:

- After-school programs and summer camps are examples of ways that *LGL Edge* can extend the school day or academic year. These opportunities can reinforce core concepts and skills in a more informal and experiential setting.

Assessment and Progress Monitoring:

- *LGL Edge* use is preceded by our online diagnostic assessments, which find individual learning gaps and create individualized programs. Formative assessments allow teachers to monitor students' progress. These assessments help identify areas of strength and weakness, enabling educators to tailor their instructional approaches accordingly.

Parental Involvement:

- *LGL Edge* includes resources for parents to support their children's learning at home. This strengthens the connection between school and home, fostering a collaborative approach to education.

Addressing Special Needs:

- *LGL Edge* is designed to address the needs of students with learning disabilities or special needs. For more information, see the section on Special Education/IEP Support.

Overview of *LGL Mathematics Edge* and *ELA/Reading Edge*

LGL Math Edge and *LGL Reading Edge* provide K-12 districts and schools with research-based instructional programs that support accelerated intervention, progress monitoring, and reporting. Both programs use our adaptive diagnostic assessments and then our LGL platform creates personalized learning paths that align with each student's learning gaps and strengths. Our platform tracks, saves, analyzes, and reports on student progress, adjusting the learning paths through pre-built formative quizzes and diagnostics. Teacher tools include narrative and data reports and parent reports in Spanish and English.

In the area of instruction, Let's Go Learn is considered a supplemental curriculum. Because its lessons are selected based on each student's own data, it is also considered a one-on-one supplemental instructional program. Let's Go Learn's supplemental curriculum can be implemented automatically via individual gap-focused courses for each student in ELA and mathematics, or teachers can directly assign lessons for each student as they see fit.

The LGL system uses detailed present-level data to determine the specific lessons a student needs. Let's Go Learn's supplemental curriculum does not use a placement score to place students into a point-in-one generalized single-subject scope and sequence, which wastes instructional time and can alternatively frustrate or bore students with lessons that are too hard or too easy.

When *LGL Math Edge* and *LGL Reading Edge* are implemented according to best practices, students' academic achievement is accelerated by filling in their individual learning gaps. Then,

through an interplay of diagnostics, formative assessments, and progressive lessons, students reach grade-level proficiency with the aid of targeted instruction and immediate feedback.

In alignment with the recommendations of the National Center of Learning Disabilities (2021), Let's Go Learn's design has incorporated these characteristics to accelerate learning:

- Reduce cognitive load to focus on grade-level content with scaffolding to fill in gaps
- Provide context for cultural relevance
- Drive engagement by aligning learning to student interests (music, narration, delivery media)
- Leverage multiple modalities to support learning styles and reinforcement
- Develop executive function and critical thinking skills through gamification features to support intrinsic and extrinsic motivation, focus, real-time scoring, and optimal performance

To ensure ongoing differentiation and academic progress and gains, the *LGL Edge* series requires that educators have students take the front-end diagnostic assessments three times a year, at regular intervals, which should include beginning of the year (within the first four weeks of the school year), mid-point, and end of the year (within four weeks of the conclusion of the school year). In addition, students must use the online lessons 3 to 5 times a week for 45 minutes a session to move steadily toward accelerated proficiency.

Special Education/IEP Support

The focus of our special education support includes:

- Smart platform that integrates assessment and SDI and performs system-wide registration, administration, tracking, reporting, and progress monitoring
- Granular adaptive diagnostic assessments in ELA/reading and math that identify gaps and strengths in relationship to key objectives in the scope and sequence for K-12 in ELA/reading and K-9 in math
- Reporting that supports identification of present levels for IEPs and the setting of short-term objectives and annual goals for students with disabilities
- Specially Designed Instruction for students with IEPs that is highly effective, evidence-based, and automatically driven by diagnostic data
- Real-time progress monitoring using scores, time-on-task, and formative assessments
- Family reporting in Spanish and English summarizing ELA/reading, mathematical understanding, and mathematical learning
- Data support for special education schools and grade-level teachers' professional development

Our reading and math programs support the IEP process for students with IEPs or students in MTSS/RTI/Intervention programs. LGL's SPED tools support these key actions for teachers and administrators:

- Establishing present levels: ELA/reading and math online diagnostic assessments that analyze student data using a K-12 and a K-9 adaptive engine, respectively.
- IEP data reporting: Real-time diagnostic data reporting with *LGL Goal Writer* that supports setting annual goals and the writing of short-term objectives for every student.
- Progress monitoring: Automated progress monitoring and reporting based on diagnostic and formative assessment data that share the same datasets with compatible baseline and progress-monitoring data.
- SDI instructional tools: Automated and teacher-directed supplemental gap-driven and standards-aligned Specially Designed Instruction (SDI) in ELA/reading and math.

Progress Monitoring

Critical to a precise measurement of each annual goal is ensuring a means of progress measurement. The LGL SPED platform provides quick, reliable formative assessments and reporting that measure overall progress toward annual academic goals, ensuring timely intervention and SDI adjustment. To accomplish this, a solid initial diagnostic assessment and ongoing formative assessment plan must be in place. This plan is a legal requirement under the U.S. Department of Education and the IDEA Act, as reinforced by the Endrew F. case. With LGL's progress monitoring in place, teachers know how and when to adjust instruction, quickly and accurately.

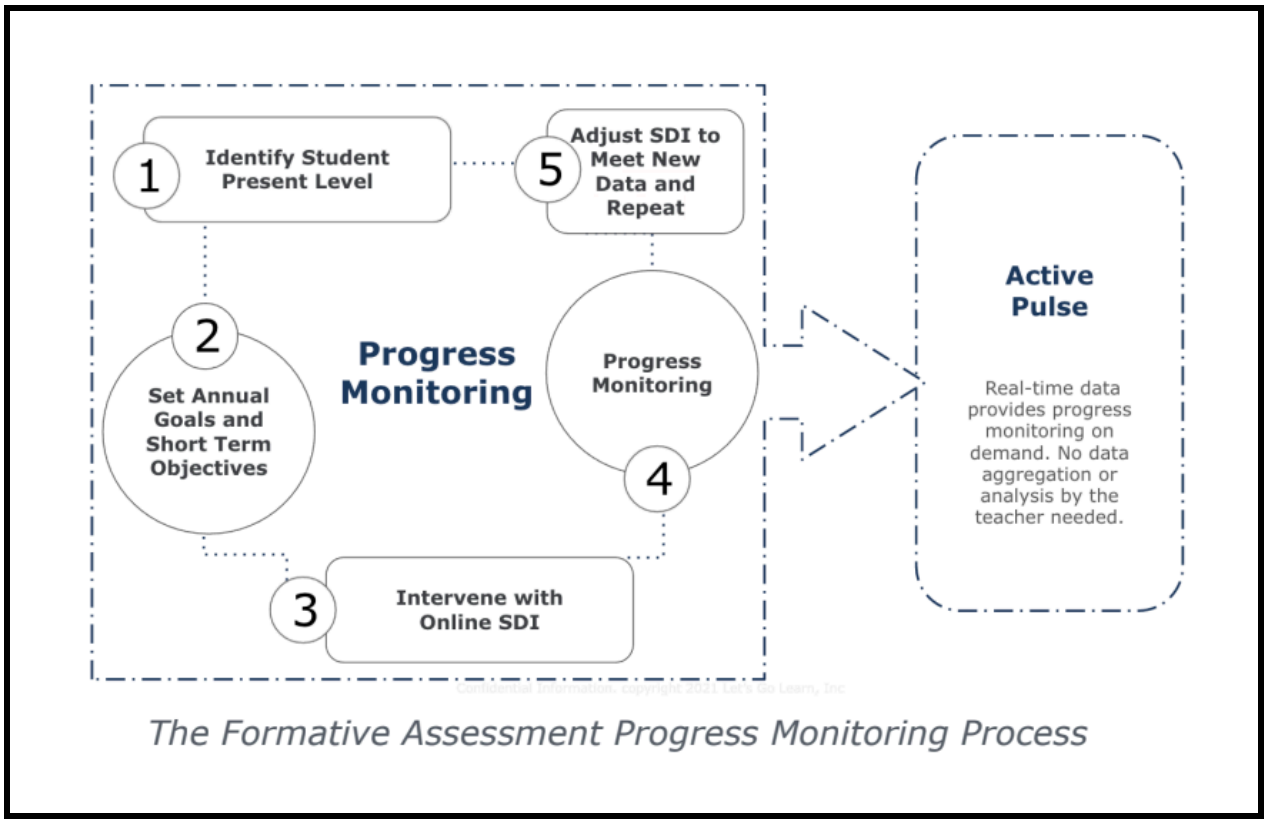


Figure 1: LGL SPED Progress Monitoring Process

LGL's SPED platform is not designed to work for all students with IEPs, but its tools can be used as "core" diagnostic assessment tools for students with IEPs. In addition, it can be a substitute for broad-based measures selected by the district for general education. Diagnostic data can always be summarized to be used for accountability purposes, but summative assessments cannot be granularized to be diagnostic.

LGL Edge is not a special education management platform that tracks data for legal compliance. While parts of our system provide data to help write IEPs or provide progress-monitoring data, we are generally used before final data goes into a repository. One more area to qualify is that we are not a Goalbook. Goalbook is a library of pre-written goals for teachers to consider for students, but it doesn't have testing data to figure out which goals are appropriate for each student. We have many customers who use *LGL Edge* and Goalbook. They use LGL to figure out where students are and what skills and concepts need to be targeted in the short term, and then they may use Goalbook to find pre-written goals in the language and format they need for their particular district.

LGL's Assessment-Instruction Educational Model

Figure 2: A-I Model

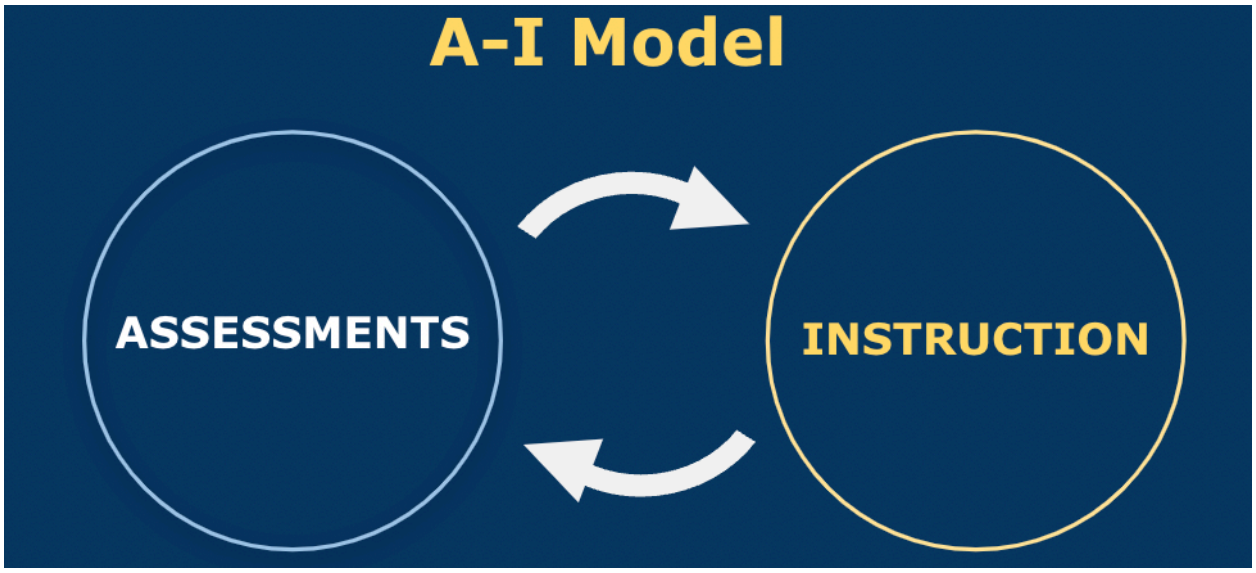


Figure 3: Operational A-I Model

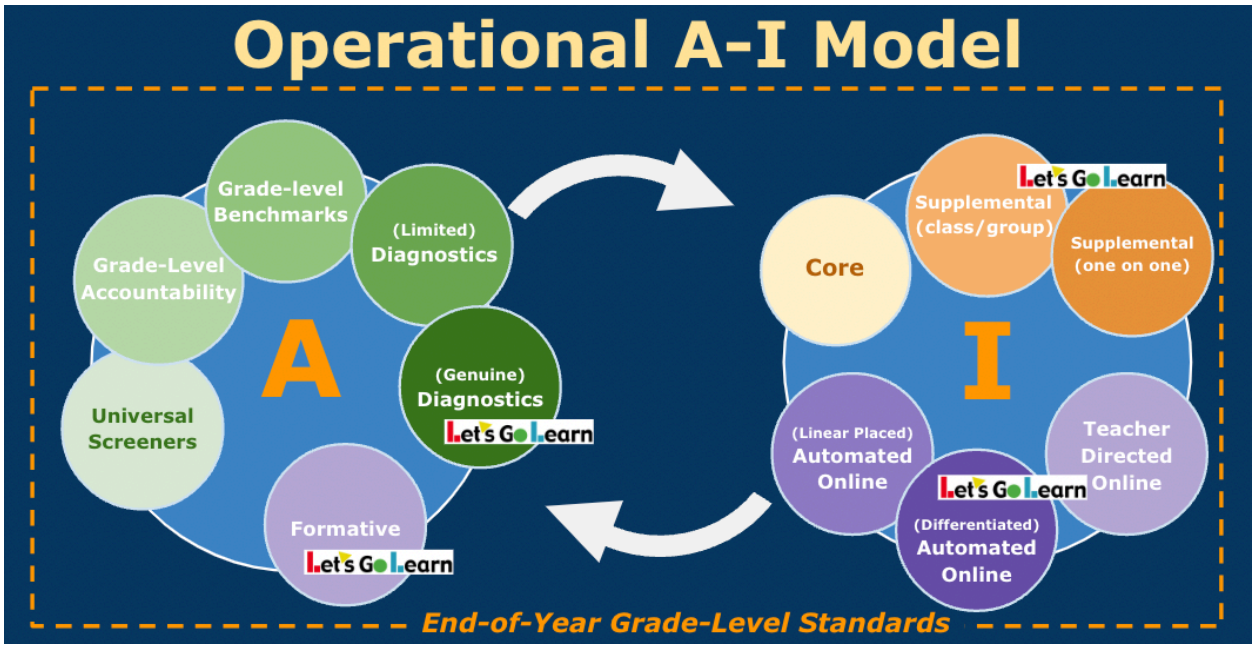


Figure 2 depicts the A-I standard instructional model, which illustrates that we assess in order to determine instruction, then re-assess in order to make adjustments to our instruction. This is the A-I cycle or model. This is what any special education teacher does intuitively.

Figure 3 depicts the operationalized model to illustrate the different types of assessments. An additional nuance depicted in Figure 3 is that there are two types of automated online instruction: *Linear Placed* and *Differentiated*. The graphic shows *Universal Screeners*, which are the lightest weighted assessments, and moves clockwise to the most diagnostic assessment, *(Genuine) Diagnostics*.

1. Universal Screeners: These are quick tests to identify how a student is doing. Examples are Renaissance Learning Star tests, possibly an early literacy screener, etc.
2. Grade-level Accountability: This can be a state test but include tests designed to measure specific grade levels and provide a performance level: far below, below, proficient, above. Another example is NWEA MAP.
3. Grade-level Benchmarks: These are often district-adopted tests given three times a year to find out whether students are on pace for their grade level. These can also be interim state tests if offered.
4. (Limited) Diagnostics: Many ed-tech companies advertise their tests as diagnostic, but these tests are limited in scope and thus fall into this category. They may be able to provide insight into a student, but only if they are not too far below grade level or if they have an unusual academic profile.
5. Formative: These are quizzes that test specific skills or concepts. **Let's Go Learn provides 500+ formative quizzes pre-built for specific topics.** When mastered, these quizzes overlay the baseline diagnostic data.
6. (Genuine) Diagnostics: These are tests that explain why a student struggles or does well regardless of grade level. Even a high school student can be found to have present levels at the K-1 level. Very few assessments go to this depth. **Let's Go Learn assesses K-12 in reading and K-9 in mathematics.**

LGL Online Diagnostics: The Key to Creating Individualized Instructional Paths

LGL has developed diagnostic assessments that support a strength-based approach to data reporting for each student: (1) the *Diagnostic Online Reading Assessment (DORA)* and (2) the *Adaptive Diagnostic Assessment of Mathematics (ADAM)*. These comprehensive assessment tools are designed to provide students, educators, and families with clear, actionable data related to student performance throughout an academic year. They analyze how each student is performing relative to grade-level content. For example, a child in the fifth grade may be reading at a third-grade level with consequent challenges in vocabulary, comprehension, and phonemic awareness.

Let's Go Learn's Reading Diagnostic: *DORA*

DORA (Diagnostic Online Reading Assessment) is criterion-referenced, adaptive, and delivered online. It is diagnostic in nature and can be used as a measure of student growth. After assessment, comprehensive reports are provided to teachers and administrators to help with SLO creations and monitoring. *DORA* diagnostically evaluates each student's reading abilities while providing the highest level of accuracy through assessments with high overall coefficient alphas. In addition, test-retest consistency is high, from 0.69 to 0.84.

Sections that make up individual sub-tests are items written to test specific skills within the scope and sequence of the sub-test. These CBM-level sections acquire their reliability in part from the test design that aggregates specific skill items together while maintaining p-values that range from 0.25 to 0.75. Individual field testing of each CBM-level section requires a mastery versus non-mastery score of 0.75 or higher, which was the lowest threshold requirement for decision consistency by pools of students with previously established skills mastered.

DORA was created to paint a picture of an individual's reading strategies more accurately across multiple measures that follow a constructivist perspective (Flores et al., 1991). The most effective way to characterize students' reading ability is to assess their reading skills across a set of criterion-referenced categories that are important to the reading process. The eight reading skills measured by Let's Go Learn are: 1) high-frequency words, 2) phonemic awareness, 3) phonics, 4) word recognition, 5) vocabulary, 6) spelling, 7) silent reading comprehension, and 8) fluency.

High-frequency words sub-test

This sub-test assesses children's ability to automatically recognize words that have been identified as frequently occurring in books, newspapers, and other texts. This sub-test uses words from Edward B. Fry's 300 sight words as test items that have been broken down into three general levels of difficulty (Fry, Kress, & Fountoukidis, 2004). A child's response time in identifying these sight words is recorded and factored into the scoring of the child's performance on the assessment.

Phonemic awareness sub-test

According to Ruddell (1998), by the time children are between three and four years old, they have learned most of the approximately 40 phonemes (discrete sounds in words) that comprise the English language. The ability to hear and manipulate these discrete sounds in spoken words is referred to as "phonemic awareness." Children demonstrate their phonemic awareness by segmenting words into individual sounds (i.e., /fish/ into /f/-/i/-/sh/), deleting sounds in words, blending sounds, adding sounds, or substituting sounds within a word to make a new word.

Some researchers have indicated that phonemic awareness is one of the best predictors of reading success (Stanovich, 1993-1994). Others further argue that phonemic awareness is both the prerequisite and consequence of learning to read (Yopp, 1992). As such, it is especially important to determine children's level of phonemic awareness in the primary grades to ensure that they get any necessary intervention as early readers, lest they struggle with reading as young adults. Specific phonemic awareness categories tested include: 1) addition, 2) deletion, 3) substitution, 4) identification, 5) categorization, 6) blending, 7) segmenting, 8) isolation, and 9) rhyming.

Phonics sub-test

In addition to developing an awareness of the discrete sounds in words, children need to master the way sounds and words are represented in English. This is important because children need to be able to effortlessly decode and recognize familiar and unfamiliar words to help facilitate the process of negotiating the meaning behind the text (Adams, 1990; Snow, Burns, & Griffin, 1998). The phonics sub-test assesses a child's ability to recognize basic English phonetic principles of high utility (Pressley & Woloshyn, 1995). These phonetic principles include: 1) beginning sounds, 2) short vowel sounds, 3) blends, 4) the silent E rule, 5) consonant digraphs, 6) vowel digraphs, 7) r-controlled vowels, 8) diphthongs, and 9) syllabification.

Word recognition sub-test

As in many informal reading inventories, such as the *Qualitative Reading Inventory* (Leslie & Caldwell, 1994), the *Basic Reading Inventory* (Johns, 2001), and the *Diagnostic Assessment of Reading* (Roswell & Chall, 1992), *DORA*'s word recognition sub-test assesses a learner's ability to recognize leveled lists of words. In this sub-test, children are presented with a number of increasingly difficult words until they reach a level at which they "frustrate" or stop recognizing the words presented to them. The final outcome of the assessment gives teachers an idea of the grade-level ability of a child to recognize words out of context. This assessment is important in identifying how well individuals can use what they know about text to recognize words outside the context of a sentence and of increasing difficulty.

Vocabulary sub-test

A learner's knowledge of words and what they mean is an important part of the reading process, as knowledge of word meanings affects the extent to which learners comprehend what they read (National Reading Panel, 2000). The vocabulary sub-test assesses a child's understanding of words. The words from this sub-test were selected by teachers and reading specialists to reflect the types of words children learn in various disciplines at different grade levels and stages of their lives. Similar to the Peabody Picture Vocabulary Test (Dunn, 1959), in the vocabulary sub-test, children are asked to select the picture that correctly corresponds to a

word they hear. The program continues to present increasingly difficult words until the child makes a certain number of errors. This sub-test provides information about a child's level of oral vocabulary.

Spelling sub-test

The process of spelling involves many cognitive processes. While each person uses different strategies for spelling words, these strategies usually have in common a familiarity with a particular word (i.e., familiarity with its meaning and visual exposure to the word), letter-sound matching, and confirmation of how the word "looks" (Bear et al., 2000; Ruddell, 1999; Gillet & Temple, 1994). Because spelling is also a generative process (as opposed to a decoding and meaning-making process in reading), it is natural for young readers' spelling abilities to lag a few months behind their reading abilities. *DORA*'s spelling sub-test tries to capture the nuances of the different processes children use to spell words by employing target words with increasing difficulty in different domains. In the process of creating the items for the *DORA* spelling sub-test, reading specialists generated a list of recommended target spelling words by examining words commonly encountered in or taught at specific grade levels. The program stops administering words when a child consistently spells words incorrectly. Items from this sub-test were chosen by reading specialists and classroom teachers to approximate the kinds of words children of a particular age would see in their classroom instruction.

Silent reading comprehension sub-test

The silent reading comprehension sub-test forms the crux of *DORA*, attempting to provide a window into the semantic domain of a learner's reading abilities. The content of each silent reading passage is expository and written to reflect the subject areas that students of a particular grade level would encounter. In a variation on protocols for some informal reading inventories (Gillet & Temple, 1994; Leslie & Caldwell, 1994), children silently read passages of increasing difficulty and answer questions about each passage immediately after they read it.

The questions for each passage are broken up into three factual questions, two inferential questions, and one contextual vocabulary question. The program stops administering passages and questions once a student misses a certain number of questions on a passage. It provides teachers with information about a child's comprehension level.

Fluency sub-test

Fluency is included as a teacher-administered measure. In this sub-test, children read aloud short leveled passages of increasing syntactic complexity. Teachers time children's reading of

these passages and record their errors and prosody using the National Assessment of Educational Progress (NAEP) Oral Reading Fluency Scale (1995).

Let's Go Learn's Math Diagnostics

Let's Go Learn has three math diagnostics: *ADAM*, *DOMA Pre-Algebra*, and *DOMA Algebra*. Their content validity comes from best practices in math curricula. *ADAM* and *DOMA Pre-Algebra* employ a gains score, or trajectory, model for student growth. Our gains score model captures grade-level progress on a particular scale or subscale between time 1 and time 2. The model is represented as GL(s)2 – GL(s)1, where GL = grade level and where (s) denotes the particular scale or subscale. The combination of an interval scale design with a K-7 set-item range allows *ADAM* to measure the growth of students' ability either within a single school year or across students' entire K-7 experience. Likewise, the combination of an interval scale design with a grade 4 to 7 set-item range allows *DOMA Pre-Algebra* to measure the growth of students' ability either within a single school year or across students' grade 4 to 7 experience. *ADAM* and *DOMA Pre-Algebra* scores can be used both to diagnose student needs and to track student growth over time.

The development of these cutting-edge math products has been spear-headed by math specialist and teacher-trainer Paul Giganti of UC Berkeley and CalState Hayward. Prior to his work in professional development, Giganti taught math in public schools for over 15 years. He has directed federally funded professional development programs in California under the auspices of the California Post-Secondary Educational Commission. Currently, he is the coordinator of the California Mathematics Council Festivals Program and Professional Development. In addition to his classroom teaching and professional development career, Giganti has published several children's picture books about mathematics. Supplementing the expertise of Giganti, LGL derives construct validity for the *ADAM* & *DOMA* series of tests by its alignment to both Common Core State Standards (CCSS) and state standards. *DOMA: Basic Math Skills* was originally aligned to California state mathematics standards in the Numbers and Measurement strands, as well as NCTM National Standards for Mathematics. *ADAM K-7*, the sequel to the *DOMA Basic Math Skills* assessment, was redesigned fundamentally and expanded to cover all five NCTM major math strands and nearly all of the CCSS. *ADAM* is aligned to CCSS and state standards in all 50 states. Further, *DOMA: Pre-Algebra* and *DOMA: Algebra* are aligned to NCTM standards, CCSS, and all 50 state standards.

ADAM

ADAM is a K-7 assessment that is multiple measured, criterion referenced, adaptive, and delivered online. It is diagnostic in nature and designed to identify each student's zone of

proximal development. Post-assessment comprehensive reports are provided to teachers and administrators to help with SLO creations and monitoring. *ADAM* diagnostically evaluates each student's math abilities while providing the highest level of reliability and accuracy and high overall coefficient alphas. In addition, test-retest consistency is high–from 0.69 to 0.84. Sections that make up individual sub-tests are written to test specific skills within the scope and sequence of the sub-test. These CBM-level sections acquire their reliability in part from a test design that aggregates specific skills items together while maintaining p-values that range from 0.25 to 0.75.

ADAM assesses across five major math strands that span 44 sub-tests of K-7/8 mathematics. The grade score range for all strands is K to 7. *ADAM* is used for grades K-7/8 for assessment of foundational math skills.

- Numbers and Operations: 14 sub-tests; 661 criterion-referenced test items in 105 constructs
- Measurement: 7 sub-tests; 133 criterion-referenced test items in 34 constructs
- Geometry: 11 sub-tests; 203 criterion-referenced test items in 53 constructs
- Data Analysis: 8 sub-tests; 106 criterion-referenced test items in 36 constructs
- Algebraic Thinking: 4 sub-tests; 305 criterion-referenced test items in 43 constructs

<u>DOMA Pre-Algebra</u>

DOMA Pre-Algebra is a grade 4-7 multiple-measured criterion-referenced assessment. It consists of 14 sub-tests that address key foundational skills in mathematics. These sub-tests employ scope and sequence math skills organized in the recommended order in which they would be taught in accordance to national and state standards . These leveled skills are also aligned with instructional grade-level content standards. *DOMA Pre-Algebra*, by design, uses an interval scale, given that it is aligned to grade-level skills that span grades 4-7. *DOMA Pre-Algebra* scores are reported as grade-level scores with partial-year growth also noted. A single adaptive *DOMA Pre-Algebra* assessment is used for all grade-level students who are learning their grade 4 to 7 foundational math skills. The adaptive nature of *DOMA Pre-Algebra* was designed so that the assessment identifies the zone of proximal development (ZPD) of each student regardless of the student's actual grade level. The grade 4 to 7 focus of *DOMA Pre-Algebra* allows teachers and administrators to identify gaps in students' learning (previous years' standards that have not been met) as well as identify students who are working above their grade level.

DOMA Pre-Algebra uses test items that are criterion-referenced to pre-requisite knowledge expectations:

- Pre-Screening: 14 criterion-referenced test items, one from each sub-test of the full assessment

● Integer Operations: 11 criterion-referenced test items
● Fraction Operations: 12 criterion-referenced test items
● Decimal Operations: 9 criterion-referenced test items
● Comparing and Converting: 10 criterion-referenced test items
● Estimating and Rounding: 6 criterion-referenced test items
● Evaluating Exponents: 6 criterion-referenced test items
● Ratios and Proportions: 5 criterion-referenced test items
● Simplifying Expressions: 6 criterion-referenced test items
● Coordinate Graphing: 8 criterion-referenced test items
● Linear Functions and Extending Patterns: 8 criterion-referenced test items
● Simple Equations: 6 criterion-referenced test items
● Geometry: 11 criterion-referenced test items
● Interpreting Data: 10 criterion-referenced test items
● Simple Probability: 7 criterion-referenced test items

DOMA Algebra

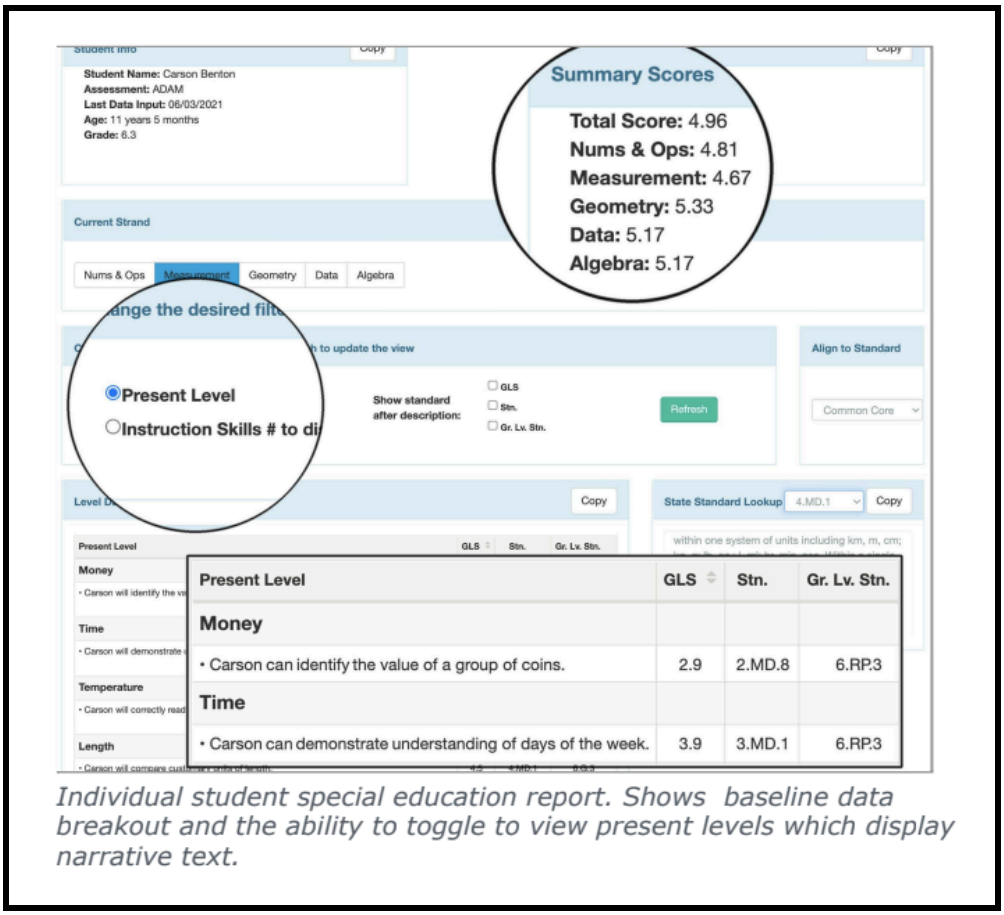
DOMA Algebra, a course-specific diagnostic assessment, consists of 11 Algebra I-specific constructs, as well as a pre-screening section much like the *DOMA Pre-Algebra* assessment.

● Pre-Screening: 22 criterion-referenced test items, representing two questions from each sub-test
● Evaluating Advanced Exponents: 7 criterion-referenced test items
● Solving Linear Equations: 6 criterion-referenced test items
● Graphing and Analyzing Linear Equations: 9 criterion-referenced test items
● Relations and Functions: 7 criterion-referenced test items
● Solving and Graphing Inequalities: 5 criterion-referenced test items
● Solving and Graphing Systems: 8 criterion-referenced test items
● Polynomial Operations: 8 criterion-referenced test items
● Factoring Polynomials: 7 criterion-referenced test items
● Radical Expressions and Equations: 7 criterion-referenced test items
● Quadratic Equations: 7 criterion-referenced test items
● Rational Expressions and Equations: 8 criterion-referenced test items

Let's Go Learn's Special Education Assessment Tools

> "When present levels academic performance statements and IEP goals are written in a deficit-oriented manner, special educators miss opportunities to see beyond the limitations and challenges that their students may face, and instead, overly focus on the shortcomings of the student. However, by adopting a strength-based approach, special educators can instead focus their attention on remediating these deficits by paying attention to the student as an individual and highlight their students' many strengths and capabilities" (Elder et al, 2018).

Each diagnostic assessment consists of sub-tests that develop a complete picture of student abilities and opportunities for growth. LGL's SPED performance data immediately populates a student's Present Levels of Academic Achievement and Functional Performance (PLAAFP) and sets baselines for annual goals. Teachers can then provide a robust, in-depth description of how the student is performing in school. LGL's platform's reporting contains not just numeric but also qualitative data: for example, "Johnny can recognize numerators and denominators in fractions."



Individual student special education report. Shows baseline data breakout and the ability to toggle to view present levels which display narrative text.

Figure 4: Sample Diagnostic Data Report

Setting Annual Goals and Short Term Objectives

LGL's SPED platform is designed so that the key elements of the IEP are "connected" by data and fused, as required by the IDEA Act, Part B, Subpart D, Section 300-305. Fitting these together creates a clear picture of a student's educational needs, performance, and progress. Setting annual goals using our diagnostic assessments is key; our design uses an algorithm that assigns and matches each student with annual goals and short-term objectives.

The annual goals provide guidance for the student's educational program by establishing areas to focus on and clear goals and objectives within these areas (Hulett, 2009). IEP Goal Writer ensures that state and federal regulations are met and that each student is assigned measurable, state standard-specific goals. Each goal is linked to a current baseline, and all goals are "appropriately ambitious" (as determined by ENDREW F. v. DOUGLAS COUNTY SCHOOL DIST. RE–1) and within an achievable range for each child. LGL's SPED platform assessment tools not

only identify annual goals but also analyze short-term objectives that ensure in a timely manner that students are progressing toward annual goals. “When written correctly, short-term objectives provide teachers with a roadmap and a clear mechanism to evaluate the child's progress” (Wright & Wright, 2006). Using the Goal Writer tool, educators can ensure a high degree of compliance and educational quality for each and every student with an IEP.

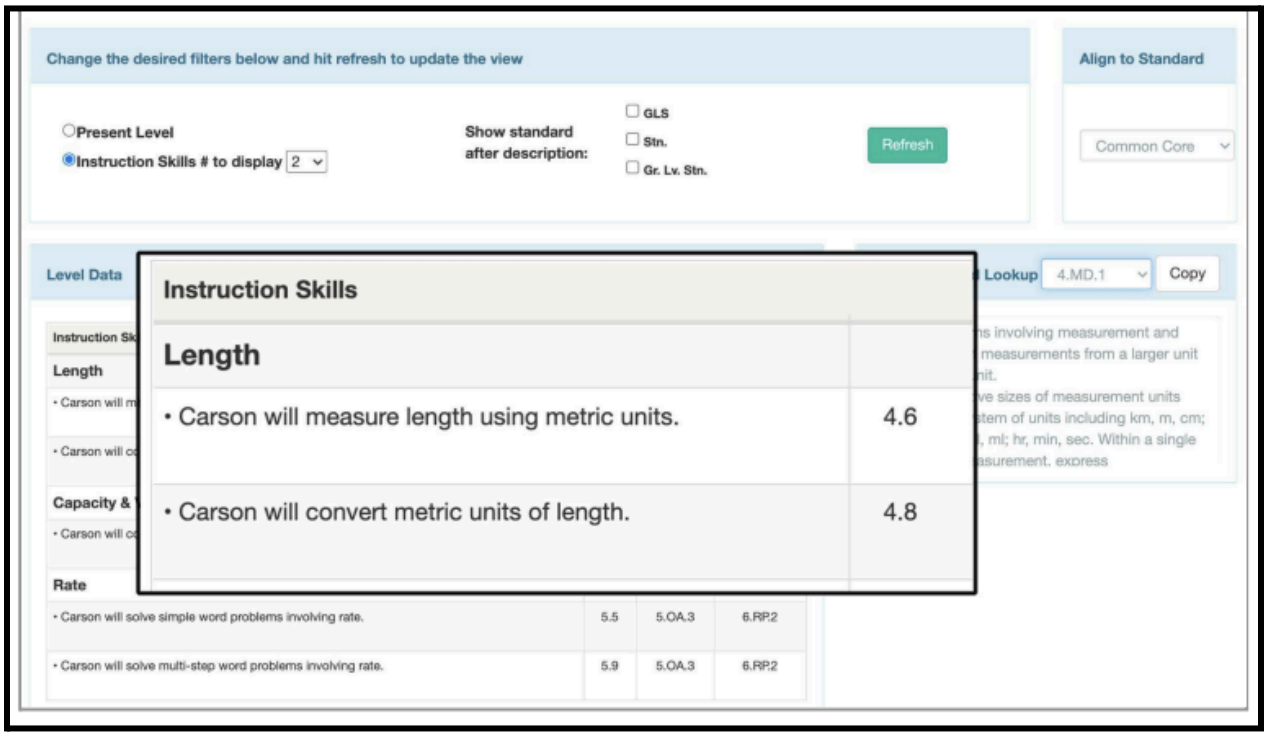


Figure 5: IEP Goal Writer

In the aftermath of the pandemic’s impact on education, LGL’s individualized instructional paths are more critical than ever to ensure that all students reach proficiency at an accelerated rate. “Our analysis provides strong evidence that learning acceleration—not the traditional approach to remediation— should be the foundation of school systems’ plans to help students recover unfinished learning from the pandemic” (TNTP, 2021).

Instruction is aligned to national and state standards to determine where a student is performing relative to grade-level content. Because our adaptive diagnostic assessment analyzes the student’s strengths, weaknesses, and grade-level placement using the scope and sequence of key standards, student academic achievement is accelerated by filling gaps and continuing to move forward to reach proficiency in grade-level content in reading and math.

Additionally, LGL's intervention instruction aligns with the recommendations of NCLD to accelerate learning (NCLD, 2021):

- Reduces cognitive load to focus on grade-level content with scaffolding to fill in gaps
- Provides context for cultural relevance
- Drives engagement by aligning learning to student interests (music, narration, delivery media)
- Leverages multiple modalities to support learning styles and reinforcement
- Implements gamification features to develop executive functions and critical thinking skills to support intrinsic and extrinsic motivation, focus, real-time scoring, and optimal performance

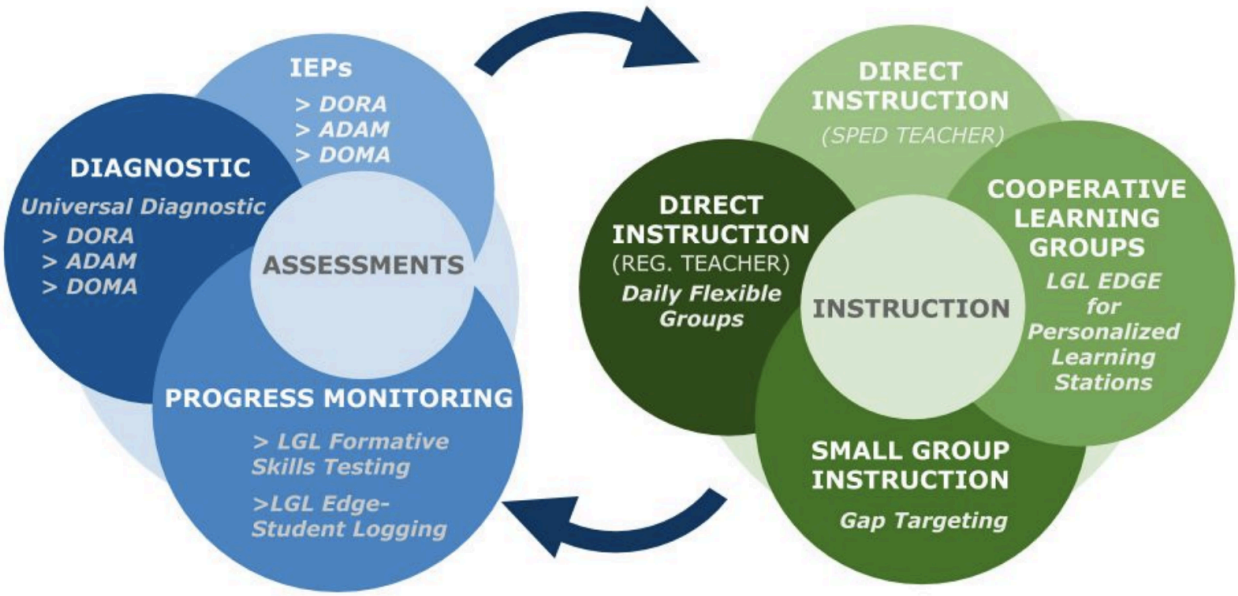


Figure 6: Assessment-Instruction Cycle

Edge Research Base

LGL's *Edge* instruction provides students and teachers with supplemental gap-driven and standards-aligned ELA/reading and math learning based on individual student performance. It provides optimal, unique learning paths with grade-level content that fills learning gaps at appropriate learning points (Levin, 1988).

Research shows that this model provides successful learning experiences whether students are performing above, at, or below grade level: "Rather than approaching instruction from a deficit model, efforts should focus on student strengths, simultaneously providing compensatory strategies and additional instruction to address gaps in learning and needed areas of growth" (Olenchak, 2009; Moon & Reis, 2004).

A key part of developing effective and equitable instruction is creating a research base that is both deep and wide and maintaining and updating the research base for the life of the program to ensure that the program serves the needs of educators and their students. During the needs analysis literature review, design, and revision phases of program design, a thorough research base ensures an optimal foundation of pedagogy and best practices: "[K]ey decisions regarding the design of instruction are based on research and experience related to human learning, instruction, and general systems theory" (Hirumi, 2022).

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is a process and outcome that focuses on good design that serves the needs and abilities of all people. Bottom line, it's a concept that supports equity in education and embraces diversity. UDL is often viewed as a way to accommodate students with disabilities and is synonymous with good design. UDL guidelines require integrating multiple means of engagement, representation, and action and expression to ensure equity and support diversity.

Engagement: Lorna Collier in her article on student engagement discusses effective ways to increase student engagement (Collier, 2015). She sites a Gallup student poll that finds that 47% of students are either not engaged or actively disengaged (Gallup, 2014). UDL boosts engagement by designing learning experiences that produce optimal engagement, "occurring

when concentration, interest and enjoyment are all high, in a merging of fun and challenge that can be thought of as "playful work" or "serious play" ((Shernoff, 2013 ; Collier, 2015)."

Representation: The CAST organization summarizes representation in this way: "...there is not one means of representation that will be optimal for all learners; providing options for representation is essential"(CAST, 2018.) Key ways to support representation in program design include using multiple formats, pointing out key elements, using simple navigation, making content accessible, and giving learners immediate feedback.

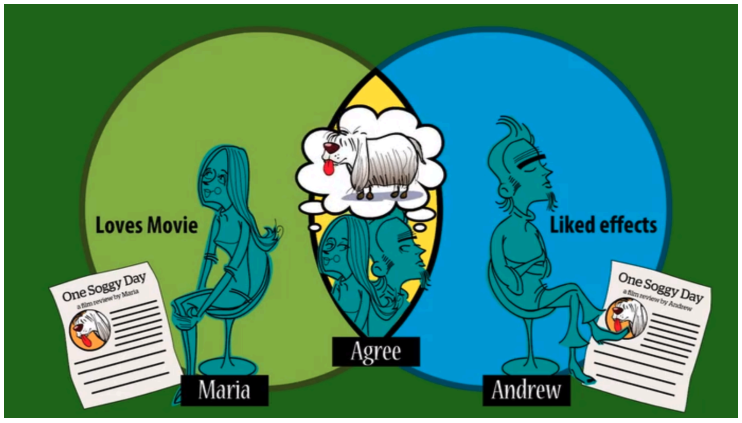
Action and Expression: Just as optimal student learning requires multiple means of representation, it requires that students have different ways to get at the content and different ways to express their learning (CAST, 2018). In Marzano's "Tips from Marzano," an excerpt from The Highly Engaged Classroom, he writes: "Research has shown that providing choices to students of all age levels often increases their intrinsic motivation. Choice in the classroom has also been linked to increases in student effort, task performance, and subsequent learning" (Marzano, 2011).

LGL Connections to UDL

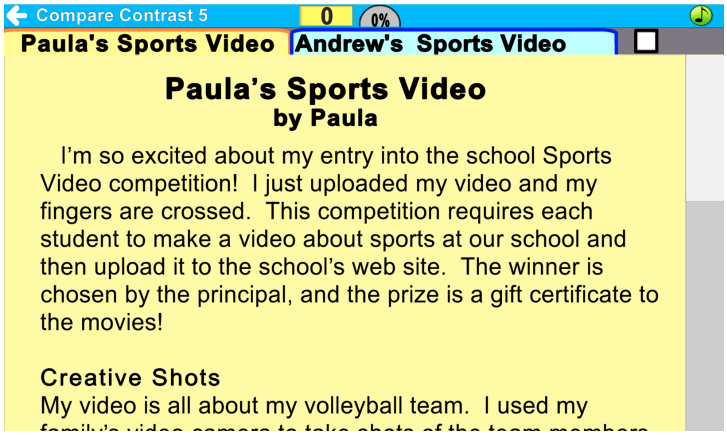
All Let's Go Learn's products use the UDL design process, and consequently, our products are accessible to all students. Diagnostic and formative assessments engage students using a clean single-screen interface, color, and audio support. Diagnostics adapt and adjust to student performance. Particularly for students with learning gaps, this decreases anxiety because they aren't forced to try to answer questions related to their gaps. Conversely, students performing above grade level continue to get items that challenge them, regardless of their grade level.

Additionally, LGL's reading and math lessons are designed with a game-based paradigm that intrinsically motivates students to accomplish activities without the limitations of time or previous failures. Songs, music, animation, graphics, and audio provide learning experiences for all learning styles. Direct instruction plays a critical part in our design and is always followed by practice with immediate feedback.

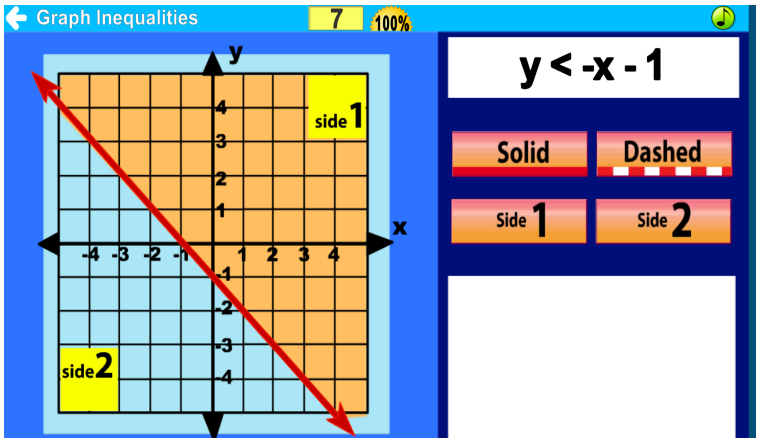
Each lesson begins with direct instruction that is audio supported and presented with animation and/or music. This segment serves to reteach and review concepts, strategies, and processes.



Direct instruction is followed by practice items that are scored as the student completes the item and clicks *Done*. In the example that follows, students click the square in the upper right corner. Background music that plays while the student completes the practice item can be turned on or off using the musical note icon.



The student score on practice items displays at the top of the screen and shows as points and as a percentage. This allows students to monitor their own performance. The scores are stored in the reports database so that teachers can monitor student progress throughout the year.



Specially Designed Instruction (SDI)/Universal Design for Learning (UDL)

Specially Designed Instruction (SDI) and Universal Design for Learning (UDL) are both frameworks used in education to address the diverse needs of learners. Because *LGL Edge* is designed to function as individualized instruction, our design makes use of the principles of SDI to ensure that the needs and gaps of all students are addressed by our mathematics and ELA/Reading supplemental instructional programs. Our goal is to use the principles of SDI and UDL to ensure that all instruction is accessible to all students from the outset. The focus is on creating a learning environment that is inclusive and flexible, minimizing the need for retroactive accommodations.

One of the most important legal tenets of IDEA (the Individuals with Disabilities Education Act) is the provision of specially designed instruction (SDI) that meets the unique needs of students with disabilities in elementary, middle, and secondary school. “In practical terms, specially designed instruction (SDI) is instruction that is tailored to a particular student. It addresses their Individualized Education Program (IEP) goals; accounts for their disability; provides modifications or adaptations to content; and encourages access to the general education curriculum” (Council for Exceptional Children, n.d.). SDI requires that instruction is provided in the most relevant form and manner to address the unique needs of the learner.

It is essential that the key elements of the IEP correspond to data, as required by the IDEA Act, Section 300.305. The primary pieces of the IEP should fit together just as pieces in a puzzle do. Each piece makes sense when combined with another, coming together to create a clear picture of the child’s educational needs, performance, and progress. Effective learning occurs when instruction is customized to the needs of each student, addressing individual strengths and

weaknesses. A strong foundation in learning objectives that support higher-order thinking skills ensures progress through increasingly difficult concepts, strategies, and processes.

One of the most critical elements of providing quality SDI is ensuring a means of progress measurement and intervention. Teachers, school staff, and parents must respond to the data. As the learning of the child ebbs and flows, so too must teachers and their tools adapt to the child. Therefore, in order to implement quality SDI, a solid formative assessment plan must be in place. This plan is a legal requirement under the U.S. Department of Education and the IDEA Act, and is reinforced by the Endrew F. case. The only way to know how and when to adjust an instructional model or approach is through progress monitoring. In addition, quality progress monitoring is the only way to ensure precise measurement of each annual goal.

Connections to SDI

Let's Go Learn uses the performance data from our online diagnostic tools to create a unique instructional path for each student based on performance, not on grade level. The same data can be used to populate the present level of performance (PLAAFP) and set baselines for annual goals. Because content is presented at a student's zone of proximal development (ZPD), students are better able to process concepts and transfer knowledge to long-term memory so that it is available to make connections as they proceed through the appropriate scope and sequence.

LGL's comprehensive diagnostic assessments are intended for administration, at minimum, at the beginning of the instructional period (school year) and at the end, but they can also be given at the midpoint to track overall progress. Our formative assessments complement and build into these longer comprehensive diagnostic assessments and are better able to track incremental progress. LGL's comprehensive diagnostic and formative assessments scale together and assess the same scope and sequence. This allows educators to track progress on the same vertical scale throughout the year and in each subsequent year. Frequent progress monitoring with formative assessments that realign the intervention to current student performance ensures the effectiveness of Data-Based Individualization (DBI).

Reduced Cognitive Load

Cognitive load theory (CLT), developed out of the study of problem solving by John Sweller in 1988, found that when cognitive load is reduced by instructional design, learning increases in effectiveness. According to CLT, the process of construction and automatization of cognitive schemas constitutes learning (van Merriënboer & Sweller, 2010). Therefore, efficient and successful learning requires an ease in the process of creating and modifying cognitive schemas

to optimize intrinsic and extraneous cognitive load for upcoming learning to levels that do not exceed the learner's cognitive capacity and do not impede the learning performance of an individual (Reif, 2010; Tracey et al., 2022).

Intrinsic: Two inputs are necessary to facilitate intrinsic cognitive load: low element interactivity and identification of prior knowledge (Chandler & Sweller, 1996). According to Olenchak (2009) and Moon and Reis (2004), "Rather than approaching instruction from a deficit model, efforts should focus on student strengths, simultaneously providing compensatory strategies and additional instruction to address gaps in learning and needed areas of growth."

Extraneous: This type of cognitive load refers to the observation that some learning is more easily achieved with certain teaching methods. "[A]ll students are capable of learning, provided the learning environment attends to a variety of learning styles" (Irvine & York, 1995; Guild, 2001). For instance, it is usually more effective to teach learners the concept of a triangle by showing them a picture of a triangle, rather than by trying to describe it in words. These factors reduce the extraneous cognitive load significantly for each learner by presenting and teaching skills in a format that is easier for students to process and absorb.

Germane: "Germane load (GL) refers to the mental resources devoted to acquiring and automating schemata in long-term memory" (Debue & van de Leemput, 2014).

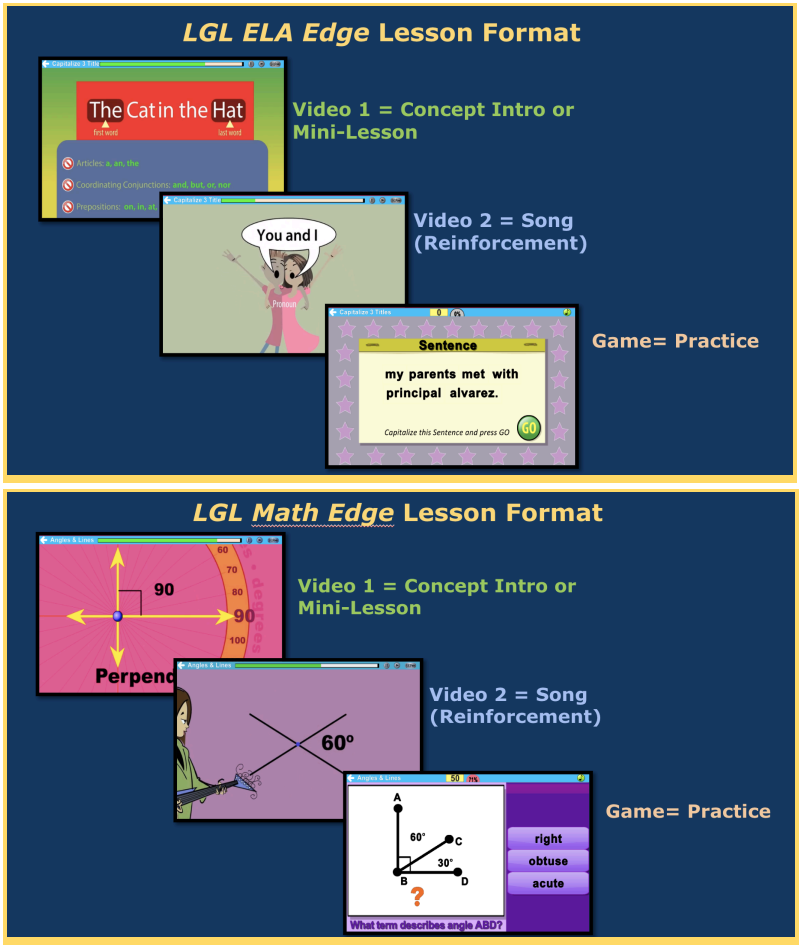
Connections to Reduced Cognitive Load

Our design provides a reduced cognitive load. LGL has incorporated three types of cognitive load theory into our program design.

Intrinsic: LGL's instructional tools depend on online diagnostics and ongoing formative assessments to identify multiple instructional points for each student; this is the basis on which lessons are assigned and delivered to each student. Thus, the intrinsic cognitive load is reduced by not presenting topics or skills that are too hard or complex for a student to learn.

Extraneous: Each student learns in a unique way based on individual abilities and interests, preferred learning style, cultural and social background, and family and personal experience. LGL instructional tools offer a diverse blend of multimedia experiences so that every student is engaged and motivated by the learning activities. Using multiple modes reduces the extraneous cognitive load significantly for each learner by teaching skills in a format that is easier for individual students to process and absorb.

Germane: To ensure that learning moves from working memory to long term memory, LGL's instructional tools incorporate multimedia, particularly animation and music. However, the biggest boost to long-term memory is the lesson design itself.



Culturally Relevant Context

The more that research reveals how we learn and remember, the wiser we become about the elements necessary for an optimal environment for each unique learner. Let's Go Learn's instructional designers recognized early that equity and diversity could best be served by creating a pop culture environment with diverse characters, edgy art, bold colors, and a wide range of environments. If learners aren't fully engaged in the learning experience, content doesn't stick. Research by Eppart et al. (2021) found that "cultural, methodological and pedagogical barriers can significantly affect the use of educational technology in face-to-face and online classes and can consequently impact student learning." In other words, context matters: "Culturally responsive education that recognizes and affirms students' cultural and racial identity also leads to better academic outcomes" (Aceves & Orosco, 2014).

In Stembridge's book on Culturally Responsive Education (CRE), she recommends CRE as a model for including "the awareness of culture, race, ethnicity, gender, ability, and other social identity markers" that drive learning experiences that include all students. She offers that the most engaging instruction is the most personal (Stembridge, 2020).

Connections to Cultural Relevance

LGL instructional tools create a meaningful context carefully designed to support student learning. Each lesson features characters, music, animation, songs, contextual art, color, narration, and video. Each student learns in a unique way based on individual abilities and interests, preferred learning style, cultural and social background, and family and personal experience. We can take a page from Hollywood as it comes to the conclusion, finally, that more diverse casts perform far better at the box office. A spokesperson for the Academy stated: "Our values at the Academy are based on the belief that arts and sciences, including the arts and sciences of filmmaking, thrive from diversity" (as cited in Wilson, 2022). It is no wonder that *LGL Edge* is so effective in supporting student gains.

Music and the Brain

Music awakens the brain and "enables the left and right hemispheres to communicate, allowing for coordinated body movement as well as complex thoughts that require logic (left side)" (Pegasus, n.d.).

Patel (2010) in an article on music, evolution, and the brain puts forward the premise that "music is biologically powerful, meaning that it can have lasting effects on nonmusical abilities (such as language and attention) during the lifetime of individual humans." He goes on to say, "[M]usic often provides an important mnemonic device for storing long sequences of linguistic information" (Patel, 2010). As an example, he refers to the alphabet song that children in English-speaking countries learn to concretize the order of the letters and that adults still refer to when categorizing or organizing information according to order.

Both research and experience inform us that music impacts emotion. According to Ahmad and Rana (2015), "Music has the potential to influence mood, feelings, and thoughts; it has the ability to change the emotional and physical status of people, whether they are in bad, good, or sad moods." A growing body of neurological research provides evidence that when it comes to learning, emotions matter: "[T]he aspects of cognition that are recruited most heavily in education, including learning, attention, memory, decision making, motivation, and social functioning, are both profoundly affected by emotion and in fact subsumed within the process of emotion" (Immordino-Yang & Damasio, 2007, p. 7).

Another positive characteristic of the integration of music and learning is that it brings a contemporary form of technology and entertainment into the classroom. In a recent ATD blog, Meacham (2022) reminds us of the following: "Music makes learning more fun, which makes us want to learn more. Music increases dopamine levels in the brain's reward center, stimulating a desire to learn more. This reward cycle can increase memory performance for nonmusical information that is associated with the music."

Connections to Music

LGL supplemental instructional programs leverage the power of music to deepen and accelerate student learning. The music that drives the lessons offers unique benefits, contributing to engagement, memory, recall, and comprehension (Hoeckner & Nusbaum, 2013). In fact, every lesson includes music to reinforce reading and mathematical instructional concepts. Different music types (jazz, country, spoken word, etc.) and song lyrics reinforce learning concepts, add to pleasure, and support the movement of learning to long-term memory.

Narrative Rate and Prosody

Often students miss content when oral instruction is delivered at a fast rate. Not only does this reduce listening and content comprehension, but it impacts fluency. Narrative prosody models not just oral fluency but also reading fluency. Research proposes "providing a narrated text to a visual source (multimodality) instead of combining the visual source with an explanatory text in writing (unimodal)" (Tracey, 2022).

Adjusting the rate of speech of content-rich narration increases comprehension, particularly for English language learners and struggling readers: "For people who lack proficient comprehension…slowing speech rate can provide a substantial advantage" (King & East, 2011; Hux et al., 2020). Research by McBride (2011) also found "a slower rate of speech yielded higher scores on comprehension questions."

Prosody and oral fluency go hand in hand. Prosody "encompasses a variety of phenomena: emphasis, pitch accenting, intonational breaks, rhythm, and intonation" (Wagner & Watson, 2010). Anyone who has sat through a lecture delivered in a monotone or worked with a digital program that uses AI narration will not be surprised that prosody improves student engagement (Servan et al., 2017). Research on infants provides evidence that prosody has an impact on language development: "[P]rosody influences how infants remember linguistic stimuli and even helps with extracting groups of words from continuous speech" (Hawthorne, 2014). Researchers have also found that prosody "can convey extra information beyond just words. This powerful form of communication can be used to improve students' recall" (Parr, 2020).

Connections to Narrative Rate and Prosody

Narration in lessons deliberately adjusts the rate of speech and increases stress and intonation to support vocabulary development, increase learner oral comprehension, and model oral fluency. The reason for adding these features to each lesson is to ensure optimal learning for all students.

Multiple Modes of Learning and Thinking

Using multiple modes reduces the extraneous cognitive load significantly for each learner by teaching skills in a format that is easier for individual students to process and absorb.

Each student learns in a unique way based on individual abilities and interests, preferred learning style, cultural and social background, and family and personal experience. LGL SDI offers a diverse blend of multimedia experiences so that every student is engaged and motivated by the learning activities: “[A]ll students are capable of learning, provided the learning environment attends to a variety of learning styles" (Irvine and York, 1995; Guild, 2001).

We know that in addition to keeping the difficulty of learning activities within the learner’s instructional level, learning happens best when it speaks to the affective dimensions of the learner’s profile. That includes (a) how the instruction is tailored to the learner’s interests and socioemotional level, (b) how the instruction provides feedback, and (c) how the instruction challenges the learner to apply previously learned skills to new concepts (Ambrose et al., 2010; Miller, 2014).

As stated earlier, research shows that direct instruction is effective in amplifying achievement, decreasing dropout rates, and increasing the number of college-bound students (Gersten & Keating, 1987, p. 29).

Connections to Multiple Modes of Learning

LGL instruction presents content learning in multiple modes to take advantage of the different ways that each person learns and thinks. Every LGL lesson uses music, graphics, and audio to present content and practice. These factors reduce the extraneous cognitive load significantly for each learner by teaching skills in a format that is easier for students to process and absorb. Every lesson begins with a direct instructional segment, presented with animation and/or music. This segment serves to reteach and review concepts, strategies, and processes.

LGL’s instruction was built to help students apply foundational concepts they already know about the topic and to present the material in an engaging context that is relevant to their age

group. The SDI uses multimedia that has been carefully designed to support student learning. Each lesson features characters, music, animation, songs, contextual art, color, narration, and video. Students learn in a unique way based on individual abilities and interests, preferred learning style, cultural and social background, and family and personal experience.

Gamification Supports Interactivity, Repeatability, Scoring, and Rewards

The individualized instruction is designed with a game-based paradigm that intrinsically motivates students to accomplish activities without the limitations of time or previous failures. Songs, music, animation, graphics, and audio provide learning experiences for students of all learning styles.

Game-based design benefits the learner by lowering the threat of failure, fostering a sense of engagement through immersion, sequencing tasks to allow early success, linking learning to goals, and creating a social context (Jenkins, 2005). In the context of a game, students can experiment and practice in a virtual environment without fear of reprisal. According to Jenkins (2005), “At their best, games put kids in charge of their own learning and, at the same time, make them conscious of the learning process itself by presenting challenges they need to work through or around.” In an engaging game-like environment, students can experiment and practice in a virtual world without fear of failing.

Connections to Gamification

LGL instructional tools in reading and math are designed with a game-based paradigm that intrinsically motivates students to accomplish activities without the limitations of time or previous academic issues. This design helps students achieve grade-level proficiency in reading and math while earning points in a motivating game. It truly resonates with today's students, who enjoy computer-based games and entertainment.

Game-like scoring provides students with ongoing formative assessment and immediate feedback. According to W. James Popham’s discussion in *Transformative Assessments*, “A particularly important finding in the bulk of the meta-analyzed studies is that ‘improved formative assessment helps low achievers more than other students—and so reduces the range of achievement while raising achievement overall’" (Black & Wiliam, 1998b, p. 141; Popham, 2008).

Students are required to demonstrate the highest level of mastery by repeating lessons until they get to the Gold level, or to 95% accuracy. Students are not allowed to repeat a lesson until

two days after their first time completing it. These factors support the deeper learning of students across the LGL SDI content areas of reading and mathematics.

1) If students don't achieve a score of 75% or higher, they will repeat that particular *LGL Edge* lesson. When the student goes back to the *LGL Edg*e lesson map, there will be no other option than to click on the same lesson icon again. The initial instructions explain this to the student.
2) If students stop before completing an entire lesson, they will have to repeat that lesson upon the next resumption of *LGL Edge*. Lessons only advance when a student completes the lesson and receives a score of 75% or higher.
3) If a student completes a lesson and then quickly clicks the "exit" button or closes the browser/window, the lesson will not advance nor will the usage be recorded. The lesson must complete on its own and push the student back to the lesson map. Don't confuse the 100 points that a student earns with the percent correct score. At the end of all lessons, there is an exciting announcement of 100 points. But this is NOT the lesson score. Thus, students may still have to repeat the lesson when they go back to the lesson map page.
4) If a student does not complete a lesson within 90 minutes, there may be a session time-out or error. The lesson will appear to be complete, but the student's session will freeze. The student may experience a Panda error or receive the message, "Sorry, your session has timed out. Any progress for the *Edge* lesson has not been recorded." Students will have to quit the browser and then log back in cleanly. They should complete their lessons in one sitting or hit the "exit" button if they must stop. A lesson will also time out after 30 minutes if the student does not press any keys or the touchscreen.

Edge score ranges per lesson:

- 75%-89% Bronze-level Medal/Star
- 90%-94% Silver-level Medal/Star
- 95%-100% Gold-level Medal/Star

NOTE: The new *Edge* V3 has a feature called Autoskip. If a lesson is attempted four times and does not reach a minimum score of 75%, the lesson will be marked "Skipped" and the student will be able to continue to the next lesson. They can always go back and take the lesson again.

LGL Product Research

Our system uses diagnostic data with Artificial Intelligence (AI) to assign instruction to students that is designed to address their learning gaps. Online specially designed instructional (SDI) courses are automatically created to use as supplemental education curriculum. Teachers can also assign lessons to individual students or groups as needed.

Our reading and math courses are especially appropriate for students with disabilities, as they:

- Correlate to all state standards
- Integrate critical thinking strategies with standards-based skills development
- Include direct instruction and practice
- Provide feedback for incorrect responses
- Use assistive technology by combining music, voice intonation, animation, and game-like interactivities

With a few clicks, classroom teachers can assign our built-in formative tests and assessments to individual students with disabilities at regular intervals. Not only do these assessments ensure that students have mastered learning objectives, but they ensure FAPE compliance. Formative assessments can be used to monitor educational progress in all educational environments, including RTI programs, afterschool, and summer school. Our next-gen system uses the formative assessment data to automatically update the student learning path.

Our educational tools for students with disabilities capture and monitor student progress in real-time, as they:

- Capture and store all student test data in a single vertically scaled dataset
- Present data in meaningful progress reports
- Support continuous progress monitoring, benchmark and goal attainment, and communication with parents of children with disabilities
- Provide special education services with quarterly and annual compliance testing data
- Provide data collection for special education teachers in school districts, whether they are in public or private education

Quality of Product Research

The most essential element of the *LGL Edge* series is its foundation in Let's Go Learn's adaptive diagnostic assessments in reading and mathematics. The assessments are criterion-referenced, valid, and reliable. If students miss a chunk of skills or subskills in reading or math, or if they miss the opportunity to practice the cognitive and metacognitive processes that guide critical thinking in these areas, their progress in these content areas is seriously stymied. How can educators assess students' current knowledge? The most effective way to determine if students are ready for algebra is to give them a truly granular diagnostic assessment. Let's Go Learn's pre-algebra computer-adaptive diagnostic assessment provides teachers with a valid and reliable measure of student readiness. Because this assessment is computer-adaptive, students who do not yet have the foundation are not subjected to a series of questions they don't know

how to solve, which can negatively impact their association with math – and specifically algebra – instruction.

The Let's Go Learn personalized learning platform, OAASIS, is a proprietary technology-based platform that simultaneously tests and reports on multiple skills while adapting to each learner's individual ability in real time. After a student completes an assessment, it automatically creates individual and class profiles, tiered grouping, standards reports, and classroom, school, and district progress and gains reports. It simultaneously analyzes student data and assigns courses and lessons that remediate learning gaps, thus serving as the foundation for the *LGL Edge* series.

LGL's assessments are criterion-referenced, valid, and reliable. If students miss a chunk of skills or subskills in reading or math, or if they miss the opportunity to practice the cognitive and metacognitive processes that guide critical thinking in these areas, their progress in these content areas is seriously stymied.

Given that our diagnostics are criterion-referenced adaptive measures, student data is not tied to a single grade level. For example, a sixth grader may need an "instructional" level that is below their grade level. Our diagnostics are able to identify gaps, even if they exist over multiple years. Thus, student instructional paths are unique to their performance on each tested standard. The same is true for students working above grade level. This design feature allows the diagnostic-to-learning path system to control for a student's prior academic history, exposure (i.e. poverty), language ability, and disabilities.

The validity of our instructional tools can be correlated to their ability to support valid instructional inferences. That is, when implementation is followed according to the best practices that we provide, results support a valid conclusion about student learning. Our instructional tools accurately define the content (i.e., the knowledge domains and skills). Because our instructional activities correlate to the constructs that our program is designed to teach, our tools have content validity.

Building a valid program begins with precise identification of discrete knowledge domains and skills necessary to bring each learner towards expertise in a specific content area. The content validity of LGL special education tools is based on a hierarchical task analysis (HTA) conducted by experts in mathematics and reading instruction (Stanton, 2006). Each HTA is translated into a list of key skills to be taught for each course in the *LGL Edge* program. The content covered, the sequence of the activities delivered, and the specific items of feedback given to each learner are driven by expert knowledge in each field.

Future Research

A key component of Let's Go Learn's roadmap is ongoing rigorous research to continue the improvement and validation of our special education platform. Our evidence-based commitment requires timely and consistent research to ensure:

- Systemic analysis of student progress toward IEP goals and objectives
- Fine-tuning of best practices implementation
- Measurement of yearly student gains
- Student performance on end-of-year state testing
- Ease of use for teachers and students
- Product integration of technology innovations that support student achievement
- Incorporation of the latest brain research to support student learning
- Support for teachers and administrators in meeting student needs

LGL has multiple ongoing research projects collecting and analyzing research data. Additionally, as state assessment data is reported, we will begin to correlate our student outcomes to state-level proficiency data.

LGL Edge Product Implementation

Let's Go Learn recommends a best practices implementation that begins with diagnostic assessment data evaluating a content-specific area of concern. For students in special education, this ensures FAPE support. The diagnostic data drives the implementation of Specially Designed Instruction that makes up a unique learning path. Frequent progress monitoring with formative assessments that realign the intervention to current student performance ensures that teachers can observe student progress in real time and adjust as appropriate. In addition, Let's Go Learn recommends that students use the *Edge* platform three to five times a week for 45 minutes a session to move steadily toward achievement and annual goals.

Implementation Integration

Prior to Instruction: One hour to complete assessment

All students are assessed using Let's Go Learn's diagnostic, adaptive learning tools in reading and mathematics. Following testing, students are automatically sorted into learning groups based on the commonality of deficits and strengths. The initial assessment determines the learning groups for the fall semester.

In the winter, students are assessed again and the learning groups are reconstituted based on the new results. The second administration establishes the learning groups for the spring semester. The final assessment takes place in late spring. In addition, using our digital SDI, students are progress monitored against the curriculum to determine if annual and short-term IEP goals have been met. Also, diagnostic testing can be used as a universal screener for RTI, with the instructional and formative assessment elements being used for Tiers 2 and 3.

Direct Instruction (Regular Instructor)

Time required: 10-15 minutes of direct instruction
Following diagnostic testing, the regular education teacher introduces the learning goals and objectives for the day. Once the learning goals and objectives (posted on the board) have been communicated and written in spirals by the students, the regular education teacher provides direct instruction.

Small-group Instruction

Time required: 10 minutes

Following this instruction, students engage in small-group activities (such as pair-share, jig-saw, etc.) to reinforce the lesson. Both the regular and special education teachers circulate around the room, assisting the small groups.

Direct Instruction (Special Educators)

Time required: 5-10 minutes
The special education teacher delivers 5-10 minutes of instruction on the identified regular education learning goals and objectives and the topic of the day to reinforce learning. This instruction can be presented to the whole class. The special education teacher also breaks down materials into small chunks and re-explains information. In addition, the special education teacher presents the information visually and has notes available for students following class (as appropriate and pending evidence that students put effort into taking notes).

Cooperative Learning Groups and Activities

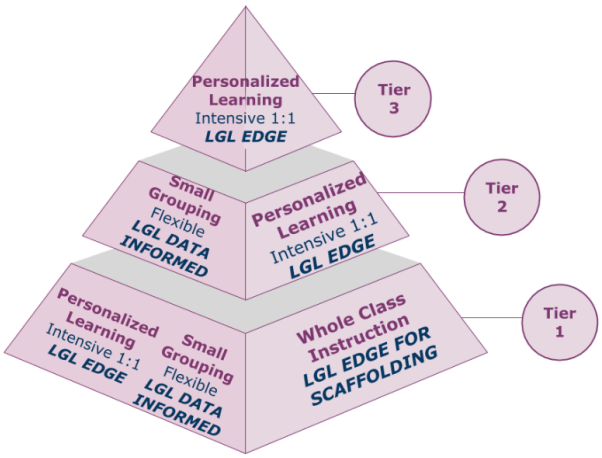
Time required: 25 minutes
Following direct instruction from the special education teacher, students break into cooperative learning stations. Each class might have four to five learning stations with different activities that engage the learner in varying formats. The groups will be determined by the Let's Go Learn instructional grouping report; students with similar needs will be grouped accordingly. Two of the learning stations can be committed to *LGL Edge* SDI. Learning can thus be differentiated and aligned with each student's specific learning needs.

During the learning activities portion of the class, the teachers circulate around the room and support students as needed. The special education teacher may also use this time to check in with IEP goal attainment. In order to assess learning, the teachers will access the learning reports directly following use of LGL SDI. On-demand reporting is provided immediately.

Best Practices for Fidelity

LGL's platform supports individualized assessment and comprehensive instruction for all students. Our automatic real-time reporting allows teachers to manage each student's reading and math progress. To ensure ongoing differentiation and academic progress and gains, educators have students take the front-end diagnostic assessments three times a year at regular intervals, which should include beginning of the year (within the first four weeks of the school year), mid-point, and end of the year (within four weeks of the conclusion of the school year). In addition, for optimal progress, students should use the online lessons three to five times a

week for 45 minutes a session to move steadily toward proficiency.



Let's Go Learn addresses the unique needs of students within Tiers 1, 2, and 3. With actionable data and programs, educators can effectively implement personalized learning via daily automatic flexible grouping, scaffolding for whole-class learning, and personalized intervention. Real-time student reports allow teachers to adjust a student's learning path, develop IEPs, and communicate progress with key stakeholders. Our platform's data warehouse reporting engine supports site and district-wide reporting for personalized learning communities (PLC) data meetings, curriculum planning, program effectiveness monitoring, and more. See the previous section for more information on flexible grouping in classrooms and schools.

LGL Customer Support

Let's Go Learn supports district and school initiatives with real-time reports, granular data, and personalized learning. District data is stored year over year so that educators can easily monitor progress towards their initiatives. For new customers, we help determine the best solutions based on their unique needs. Once customers determine their focus, we build a customized professional development plan for district implementation.

Planning Implementation

Every school or district is assigned a Customer Success Specialist who partners with educators to ensure a successful implementation. Our Customer Success Specialists continuously seek feedback from schools and teachers, and our programs are updated to reflect changes necessitated by feedback and student data.

We recommend that the school or district assign a point of contact to facilitate scheduling and communication with staff. The CSS assists with running reports, interpreting data, conducting training, and suggesting best practices. During meetings, educators schedule training and planning sessions for the semester or school year. Our customized approach allows educators to focus on specific content, departments, or grade levels.

Building a Professional Development Schedule

Let's Go Learn recommends yearly platform training. In addition, we recommend professional development so that teachers benefit from special education and/or data topics. We offer data interpretation or specialized training based on school-specific goals with options for on-demand, virtual, or in-person sessions. The CSS works with educators to complete an Implementation Journey Document that tracks all professional development training.

Quarterly Reviews

To ensure that Let's Go Learn products are genuinely meeting the needs of educators, administrators, students, and families, the CSS does at least quarterly reviews with schools to collect data for updates to current tools and for the development of new tools as the education environment changes. For our special education tools, this includes keeping informed about legislation, student performance, teacher satisfaction, and research.

Over the last two decades, LGL instructional materials have evolved to include best-in-class AI special education tools, a learning platform, diagnostic ELA/reading and math assessments, adaptive math and reading SDI/instruction, progress monitoring and formative assessments, and leadership training services.

Our metrics include:

- 102 million diagnostic math and reading assessments administered worldwide
- 4 million lessons completed
- 1.2 million instructional hours

Our versions are continuous since we have an online product. All users are using the latest versions and it is not possible to use older versions.

References

First Reference
San Bernardino City Unified School District
Dr. Howana Lundy, Special Education Director
(909) 880-6863, howana.lundy@sbcusd.k12.ca.us

Second Reference
Egg Harbor Public School District
Dr. Gina Forester, Director of C&I
609-965-1034, gforester@eggharborcityschools.com

Product Effectiveness

Case Studies

Full documents of these case studies are available by linking to the documents here or from Appendix A2.

Case Study 1: Downey Unified School District, Sussman Middle School

Link to Case Study

This case study highlights the strength of *LGL Math Edge* with middle school students, who often have extremely challenging gaps in mathematics. In a short period of time, students' gaps were filled and Sussman experienced very large gains in their state proficiency scores. The administration attributed the gains to *LGL Math Edge*. Sussman is a highly diverse Title I school.

Case Study 2: Montebello ELA and Math

Link to Math Case Study Math - Link to ELA Case Study

Montebello Unified School District ran short 14-day summer school sessions in 2017 and 2018. The district adopted Let's Go Learn's personalized learning platform, the *LGL Edge* series, to accelerate remediation with data-driven personalized instruction and achieve intensive intervention efforts over two weeks. In both the 2017 and 2018 summer sessions, student gains in reading were significant. Similarly, in both the 2017 and 2018 summer sessions, student growth in math and reading was significant. The data strongly indicates that students who had more time on task with *LGL Edge* realized greater gains because in these summer school sessions, only *LGL Edge* was used instructionally. Thus, these results support the use of *LGL Edge* as a targeted gap-focused intervention during the school year.

Case Study 3: San Bernardino City Unified School District

Link to Case Study

Across elementary, middle, and high school students with IEPs, students who had more time on task with *LGL ELA Edge* and *LGL Math Edge* demonstrated statistically significant greater overall gains as measured by the *DORA* total reading weighted score (WS) and the *ADAM* total math score (Total). SBCUSD was able to more effectively implement their program initiatives, and teachers were able to directly increase student achievement using the diagnostic assessment and SDI tools found within the Let's Go Learn platform.

Third-Party Research

Full documents of these third-party research reports are available by linking to the documents here or from Appendix A2.

An Early Investigation of the Let's Go Learn *Edge* Program: Analyzing Program Impact after an Initial Implementation Year

Link to Report

This retrospective study was conducted with the support of a central California school district. It employed district-wide state achievement data to isolate program effects following the initial year of *Edge* implementation. Weighting was used to make LGL and comparison groups equivalent on variables of gender and Individual with Disabilities Act (IDEA) indicators. For the English Language Arts/Literacy (ELA) assessment, score differences for all students and for grade 6 students proved statistically significant. For the Mathematics assessment, gain score differences for all students, for grade 4 students, and for grade 6 students proved statistically significant.

The Impact of Adaptive Learning on Mathematics Achievement

Link to Report

The results of this study showed that there was a statistically significant difference in student achievement when students received the Let's Go Learn treatment of adaptive learning. This was true for all subgroups examined, including students with IEPs. The results of this study also showed that there was a statistically significant relationship between the amount of time students spent in *LGL Math Edge* and mathematics achievement on *ADAM*. The findings thus revealed that using supplemental adaptive lessons in addition to conventional instruction improved student achievement in mathematics.

Appendix A: Reference Lists

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Appendix B: Retrievable Links to Evidence of Efficacy

Case Study 1: Downey Unified School District, Sussman Middle School

Link to Case Study

Case Study 2: Montebello ELA and Math

Link to Math Case Study Math - Link to ELA Case Study

Case Study 3: San Bernardino City Unified School District

Link to Case Study

An Early Investigation of the Let's Go Learn *Edge* Program: Analyzing Program Impact after an Initial Implementation Year

Link to Report

The Impact of Adaptive Learning on Mathematics Achievement

Link to Report

Appendix C: Technical Requirements

Organizational/technical requirements are described below. Our products are available for school, home, and professional development use.

Network/Bandwidth Requirements (School/District Use Only)

Overview: Internet bandwidth needs are based upon the number of users who are taking assessments concurrently from a site. The initial start-up of the assessment uses the most bandwidth. Once students are in the middle of an assessment, bandwidth needs decrease. Network quality must be sufficient to avoid packet loss when multiple computers are assessing students. Generally, modern network equipment less than three years old should be adequate.

Schools and districts can check bandwidth at this site (choose the San Francisco server):
https://www.speakeasy.net/speedtest/

Internet Connection Requirements

- DSL, cable, satellite, or WiFi Broadband internet connection
- Internet connection speeds of 1.5M/256K or higher are recommended, though this requirement may vary based on your overall network needs.

Local Area Network Requirements

- LAN, including routers, switches, and network cards, should be 100mBit or greater
- All labs using the assessment must be on switches, not hubs
- Chaining a switch into a single port of another switch is not advised unless both switches have 100mBit capacity and are running at full duplex.
- Any old or unusual network configurations may cause network collisions and result in packet loss. This will make the assessment seem as if it is freezing, when actually packet loss is preventing the data from reaching the computer running the assessment.

Recommended Browsers

- Chrome - latest version
- Safari - latest version
- Firefox - latest version

Recommended Screen Resolution

- Minimum screen resolution: 1366x768

Audio Settings

- Sound should be enabled on the computer and be audible to the user

Available Apps

- *LGL Edge* lessons are now available on both Android and Apple iOS Platforms for the following devices: Apple iPhones, Android phones, Apple iPads, and Android tablets.

- Note: Instructions are available on Let's Go Learn's website page: Help Center.

Infrastructure Changes: Operation Platforms

Recommended Operating Systems

- Windows or MacOS on desktop/laptop: latest version
- Chromebook running Chrome OS: latest version
- iPad iOS: Version 10 .x or higher
    - Supported
        - iPad 6 or higher
        - iPad Air v3 or higher
        - iPad Pro all versions
    - Not Supported
        - iPad mini
- Android OS on tablet: latest version

Appendix D: Special Education Accessibility Features

Currently our platform is WCAG 2.0 A compliant and approximately 50% AA compliant with full AA compliance ready for the 2023-24 school year. Together our online diagnostic and formative assessments allow teachers to collect multiple data points in order to diagnose students in reading and mathematics. This document explains our accessibility approach and features.

Note: Accessibility depends on what each assessment is intended to measure. We assume in our design that the teacher or specialist will not try to administer a diagnostic assessment that is inappropriate for a student. A good example is our phonemic awareness assessment, which examines a student's ability to hear and manipulate sounds. Because this assessment is inappropriate for deaf students, an audio accommodation would not be meaningful.

Built-in Features

The following features are built into Let's Go Learn diagnostic assessments.

DORA and *ADAM* Diagnostic Assessments

- **Repeat audio buttons:** Students can repeat audio at their discretion.
- **Scaling of questions on the screen**: All test questions and responses scale to the monitor resolution as well as to the browser's accessibility adjustments. Thus, for students whose accommodation may be visual and who are using special computer equipment, our test questions and answers will scale in size to the monitor and/or browser window.
- **Closed captioning (coming fall 2024):** Currently, audio read aloud by the assessment is accompanied by text displayed on the screen for the *ADAM* assessment, but close-captioned tagging is not in the source code of the pages for certain automatic readers to pick up. This feature is scheduled to be added by fall 2024.
- **Non-timed silent reading**: Passages in the *DORA* silent reading comprehension sub-test are non-timed. This allows students who require more time to read to take as much time as needed to read any passage.
- **Repeat button:** Allows the student to replay the audio from any question.
- **Scaling**: All displayed text, images, and passages scale automatically to the width and height of the web browser window to maximize display size in addition to adjusting to the accessibility settings of the browser.

ADAM Assessment

- **Reading aloud math word problems**: All sentences or paragraphs in the *ADAM* math assessment are read aloud to students. This not only controls for a reading bias but also

provides audio support for students with reading issues, such as some forms of dyslexia. This feature is built into the assessment and does not need to be turned on.

- **Repeat button:** Allows the student to replay the audio from any question.
- **Scaling**: All reading items maximize to the browser width and height; thus, the sizing of type is automatically scaled. In addition, text adjusts to the accessibility setting of the browser.

Device Built-in Accessibility

Note: Because these are computer-adaptive assessments, the hardware with which a student is tested will provide additional accommodations for students with particular needs. Let's Go Learn does not have a policy against teachers using any specialized computer, audio, or visual equipment as long as it is in fulfillment of the student's accommodations.

Built-in Accessibility

- Google Chrome Web Browser: To see accessibility features, click the three-dot menu on the top right of the browser window and go to Settings. On the Settings page, click the Accessibility button. From there, you can: 1) turn on Live Caption, 2) choose Caption preferences, 3) turn on "Show a quick highlight on focused object," and 4) turn on "Navigate pages with a text cursor," or go to Chrome Web Store and select other features.
- Chromebooks: To access these settings, press Alt + Shift + s or click "Settings" and choose "Advanced." Then, choose from a list of accessibility features that include: 1) text-to-speech, 2) type text with your voice, 3) display options, 4) keyboard options, 5) mouse and touchpad options, 6) audio options, and 7) Chrome live caption.
- iPads: To find the accessibility options, go to Settings and select "General." Tap the Accessibility button and choose from a list of features that include: 1) vision options, including increased text size; 2) speech options, including text-to-speech; 3) Zoom mode; 4) VoiceOver to allow navigation by touch; 5) display accommodations, including color filters and increased contrast; 6) closed captioning and SDH under Subtitles and Captioning; and 7) AssistiveTouch settings, which accesses Siri. Note the iPad supports through Bluetooth, devices made with MFi standard.
- Microsoft 365, Windows, and Office products: These provide many accessibility tools, including features for vision, hearing, neurodiversity, learning, mobility, and mental health. Features are discussed in depth on the Microsoft accessibility pages.
- Apple products: These have built-in accessibility tools for vision, hearing, mobility, and cognition. Features are discussed in depth on the Apple accessibility pages.

- G Suite: G Suite accessibility tools include those for both developers and users. There are two guides available online: Google Workspace Administrator Guide to Accessibility and Google Workspace User Guide to Accessibility.

Accommodations via Assessment Proctor

Given the nature of Let's Go Learn assessments, test accommodations tend to have more flexibility based on the discretion of the resource teacher or the district policy. *DORA*, *ADAM*, and *DOMA* are diagnostic assessments, meaning that their data is generally not used for high-stakes accountability. As a result, if the student's accommodation calls for the allowance of a calculator during a math assessment, Let's Go Learn permits this accommodation to be made and does not have a strict policy against a teacher or administrator making the decision.

DORA Assessment Accommodations

In some cases, students may not be able to complete *DORA* by themselves. A test proctor may help by repeating audio, reading text, or actually clicking and selecting choices. Thus, the role of the test proctor will vary. To ensure standardization, it is important that the proctor closely follow the guidelines for each subskill. At no time should the proctor assist the student with content for answering or with scaffolded information.

- **High-frequency sub-test**
    - As this is the only timed sub-test, the role of the proctor is particularly important. The student will hear the word read aloud. The proctor should not repeat the word. Once the word has been pronounced by the program, the proctor must quickly and clearly spell each answer option to the student. The student may ask to have any single answer repeated only one time, since this is a timed test and the idea is to measure immediate high-frequency word recognition. Once the student selects an answer, the proctor will click "repeat" once to reset the test's timer, and then the proctor will choose the selected answer and proceed to the next item. Remember, the speed and clarity of spelling answer choices is critical for the proctoring of this sub-test. If the student hesitates in selecting the answer but the answer is correct, the proctor should not hit the "repeat" button. This will record the answer as incorrect due to the student taking too long.
- **Word recognition sub-test**
    - The student will hear the word read aloud. The proctor should not repeat the word. Once the word has been pronounced by the program, the proctor must clearly spell each answer option to the student. The student may ask to have any

single answer or all answers repeated as many times as necessary, as sighted students will have an unlimited opportunity to read the options. Once the student selects an answer, the proctor will click on the selected choice and proceed to the next item. As this exercise is untimed, the student may take as long as necessary to complete the sub-test.

- **Phonics sub-test**
    - The student will hear the word read aloud. The proctor should not repeat the word. Once the word has been pronounced by the program, the proctor must clearly spell each answer option to the student (without reading the word aloud). The student may ask to have any single answer or all answers repeated and spelled as many times as necessary, as sighted students will have an unlimited opportunity to see the options. Once the student selects an answer, the proctor will click the selected choice and proceed to the next item. As this exercise is untimed, the student may take as long as necessary to complete the sub-test.
- **Phonemic awareness sub-test**
    - The student will hear the instructions for each question and the possible answers read aloud. The proctor should not repeat the questions or answers. The student may ask to have any single answer or all answers repeated and the proctor will click the “repeat” button, which will replay the question and choices. The student will then select an answer: “The first choice is correct” or "the fourth choice.” Alternatively, the student may repeat aloud which choice is correct. Once the student conveys an answer choice, the proctor will click the selected choice and proceed to the next item. As this exercise is untimed, the student may take as long as necessary to complete the sub-test.
- **Spelling sub-test**
    - The student will hear the word read aloud by the program. The proctor should not repeat the word. Once the word has been pronounced by the program, the proctor will instruct the student to spell the word orally. The proctor will type in the spelling exactly as it is pronounced by the student. Once the word is spelled, the proctor will proceed to the next question. As this exercise is untimed, the student may take as long as necessary to complete the sub-test.
- **Word meaning sub-test**
    - The student will hear the word presented aloud by the program. In this assessment, the proctor will factually describe each picture in detail. It is important that no information be added or omitted; however, a detailed description should be provided without using the word read aloud by the program. For example, for a picture of an elephant, the proctor will simply state,

"The picture shows a large animal with a trunk and large ears standing in a grassy field." The student will select the picture that best represents the word that the program presented. The proctor will click on the picture chosen by the student. As this exercise is untimed, the student may take as long as necessary to complete the sub-test. Proctors should avoid using the target word in their descriptions of the pictures.

- **Silent reading sub-test**
    - The proctor will read each passage aloud to the student. Once the passage is complete, the proctor will read each answer choice to the student. The student may ask to have any of the answer choices or any part of the passage repeated (or the whole passage, if necessary). It is critical that the proctor read each passage with clarity, enunciating each word carefully. The proctor will click on the answer choice selected by the student and proceed to the next question. As this is an untimed exercise, the student may take as long as necessary to complete the sub-test.

ADAM & *DOMA* Assessment Accommodations

- **Math Questions**
    - Generally, all audio is read aloud in the *ADAM* assessment, but in *DOMA Pre-Algebra* and *DOMA Algebra*, this is not the case. Also, in some math problems, a diagram may not be visible to a test-taker. In cases of high visual impairment, the test proctor will need to describe the image to students so that they can answer the math question. This is allowed. For example, in the case of testing whether a student understands what an equilateral triangle is, the question will be read aloud: "Click on the equilateral triangle." Four images will appear. There is no time limit. If students cannot see the images, even under high contrast display, they may describe an equilateral triangle to the test proctor and the test proctor can click on the correct choice. While our math assessments provide some dynamic adjustments, depending on the impairment of the student, a test proctor can ensure the proper diagnosis of a student's math abilities.