Pearson's Dyslexia Toolkit: Related Topics

A series of resources that connect to your work in dyslexia.

2024

Dyscalculia... and How It Relates to Dyslexia

Abstract

Dyslexia and dyscalculia are distinct, but commonly co-occurring, learning disabilities. Professionals benefit from a clear understanding of each disability and their relationship to support differential diagnosis and intervention/instruction planning. In this report, the authors present multiple perspectives on the definition and scope of dyscalculia, including common questions related to dyscalculia. In addition, tools and resources that can be used to support individuals with dyscalculia are offered within the context of a workflow including screening, diagnostic assessment, intervention, and progress monitoring.

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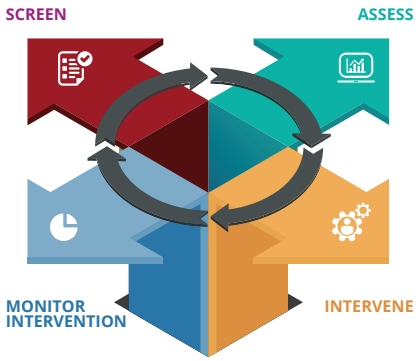
Dyscalculia... and How It Relates to Dyslexia

Pearson Clinical Assessment offers a dyscalculia toolkit with resources for screening, identification, intervention, and progress monitoring. This report will be updated periodically as new tools become available.



The term dyscalculia comes from Greek and Latin: "dys" meaning "impaired" and "calculia" (calculare) meaning "to count." Dyscalculia, along with dyslexia and dysgraphia, are among the most prevalent specific learning disabilities in school-age populations.

Pearson's dyscalculia toolkit includes clinical and classroom resources for screening, diagnostic evaluations, intervention, and progress monitoring. Included are tools that can be used across a wide range of professional groups and user qualification levels.

Pearson's Dyscalculia Toolkit

SCREEN	ASSESS	INTERVENE	MONITOR
Kaufman Test of Educational Achievement™ (3rd ed.; KTEA™-3) Brief Form	KeyMath™-3 Diagnostic Assessment	KeyMath-3 Essential Resources	aimswebPlus™
Wide Range™ Achievement Test (5th ed.; WRAT™5)	KTEA™-3 Comprehensive Form	KTEA-3 teaching objectives and intervention statements	Growth scale values (GSVs) for KeyMath-3, WIAT-4, and KTEA-3
	Wechsler Individual Achievement Test® (4th ed.; WIAT®-4)	WIAT-4 intervention goal statements	Progress Monitoring Assistant™ for WIAT-4
	Process Assessment of the Learner™ (2nd ed.; PAL™-II) Math	PAL-II Revised User Guide for Math	Review360®
	Tests of intellectual and executive functioning are also included!		

Each resource in this toolkit shows strong empirical evidence on its own. The power of a toolkit comes from understanding the need for multiple tools and how they fit together to guide clear decision-making, giving the collective effort additional power. Clear data, a sufficient knowledge base, and team-based decision-making allow the best path forward.

Understanding Dyscalculia

Developmental dyscalculia is a specific learning disability with a persistent impairment in mathematics; deficits may impact number sense, retrieval of arithmetical facts, accurate or fluent calculation, and mathematical reasoning (the Diagnostic and Statistical Manual of Mental Disorders [5th ed.], text rev.; DSM-5-TR).[3] Dyscalculia is not due to a lack of instruction, motivation, or effort, nor can it be attributed to low intelligence or reading ability.[3]

Dyslexia and dyscalculia are distinct learning disabilities that can present concurrently or separately. Key signs of dyslexia and dyscalculia are summarized in Table 1. Some students with dyslexia experience math difficulties due to processing weaknesses associated with dyslexia, but these math weaknesses are not consistent with dyscalculia because they do not involve deficits in basic number processing.[37] For this reason, it's important for evaluators to determine whether a student's math weaknesses are primary (dyscalculia), or secondary, better explained by another disorder or condition such as attention-deficit/hyperactivity disorder (ADHD), math anxiety, or dyslexia.

Students with comorbid dyscalculia and dyslexia respond differently to math intervention than those with dyscalculia alone, and they tend to have more severe cognitive deficits and academic impairments.[20, 40]

Table 1. Signs of Dyslexia and Dyscalculia

Signs of dyslexia[a, 25, 37]	Signs of dyscalculia[18, 22]
• Difficulty with word reading, decoding, and oral reading fluency • Signs of difficulty typically emerge in preschool or kindergarten when early literacy skills are introduced • Some have trouble with arithmetic fluency and verbal number tasks like word problems, but basic number processing is intact • Difficulty acquiring letter-sound knowledge and naming/writing letters • Better comprehension while listening than reading • Difficulty with spelling and written expression • Poor response to literacy instruction • Avoidance of reading and writing tasks	• Difficulty with math calculation, math problem solving, and/or arithmetic fluency • Signs of difficulty typically emerge in preschool or kindergarten when basic mathematical concepts are introduced • Difficulty acquiring early numeracy skills, including counting, seriation, and comparing quantities • Math errors reflect faulty conceptual understanding of procedures or numbers • Difficulty with arithmetic and math procedures, lack of transition from counting to non-counting strategies • Slow or inaccurate math fact retrieval; persistent (beyond age-appropriate) finger counting for simple facts • Poor response to math instruction

[a]Refer to the Dyslexia toolkit white paper on www.pearsonassessments.com for more information about dyslexia assessment.

Co-occurring Conditions

Dyscalculia commonly co-occurs with other learning disorders (e.g., dyslexia and dysgraphia), other neurodevelopmental disorders (e.g., ADHD), and mental health disorders such as anxiety and depression.[3] Based on research showing a strong connection between dyscalculia and these other conditions, practitioners are advised to screen or assess for co-occurring conditions as part of an evaluation for dyscalculia, and to screen or assess for dyscalculia with students who have dyslexia, dysgraphia, ADHD or are being evaluated for attention and executive function problems.

Domain-general deficits in areas such as processing speed, working memory, and attention often contribute to co-occurring symptoms of dyslexia, dyscalculia, dysgraphia, and/or ADHD.[3] In addition, processing strengths and weaknesses should be considered in treatment planning.[20, 37] Hence, although assessment of cognitive processing deficits is not required for identifying a specific learning disability according to DSM-5-TR[3] or IDEA[24], cognitive ability assessments are helpful to include as part of a comprehensive evaluation.

Without sufficient treatment, dyscalculia can persist into adulthood.[3] Due to its interference with practical math skills, education, and employment, dyscalculia can have detrimental effects in daily life, school, and in the workplace (see Table 2).

Table 2. Potential Impacts of Dyscalculia in Daily Living

Children[4, 5, 52]	Adolescents and adults[39, 45]
• Internalizing symptoms such as math anxiety, generalized anxiety, emotional distress, low self-esteem, and depression • Externalizing symptoms such as attention and behavior problems	• Managing and using money: basic skills such as calculating change and applying discounts, and higher-order skills such as financial planning and investment decisions • Time management, time estimation, and punctuality • Remembering codes or phone numbers • Social and emotional well-being (e.g., low self-esteem and depression, feelings of frustration, guilt, anxiety, and worry associated with math) • Higher risk for unemployment or underemployment

Assessment for Intervention

To understand the nature of a student's math difficulties and the affected skills and abilities, an in-depth assessment is needed. Students with dyscalculia are heterogeneous both in their mathematics performance and in related cognitive skills.[23, 43] As such, the required math interventions for students with dyscalculia will differ depending on the underlying cognitive profile.[20, 37]

Due to the heterogeneity that characterizes dyscalculia, efforts to reliably classify students with dyscalculia into subtypes based on their areas of impairment have been inconclusive.[23] Hence, practitioners should expect that many students with dyscalculia will not fit into a recognized subtype or learning profile. Still, there is value in practitioners knowing the most common dyscalculia deficits because recognizing these patterns can facilitate a targeted intervention plan.

The following types of dyscalculia deficits have been proposed:[21]

- Number sense deficit: Deficit in the inherent understanding of small quantities and the symbols (e.g., Arabic numerals) that represent them (e.g., 4 = ■■■■), and of the approximate magnitude of larger quantities. Difficulties with number sense may be related to a deficit in the ability to form spatial representations.
- Procedural deficit: Difficulty executing procedures for solving arithmetic problems.
- Semantic memory/fact retrieval deficit: Difficulty retrieving arithmetic facts from long-term semantic memory.

- Visuospatial deficit: Difficulty representing and interpreting visuospatial representations of mathematical information. Visual charts/graphs and geometric shapes may present difficulties; however, visuospatial skills also support a mental workspace for a wide range of mathematical transformations and operations, such as when adding or subtracting numbers, the operations and operands can be imagined/conceptualized along a number line.

In the absence of commonly accepted criteria for identifying dyscalculia, the following research-based recommendations are helpful for guiding a dyscalculia evaluation:

- Avoid making a diagnosis based on a single test score or psychometric cut point. A student who shows weak math performance in a single assessment does not necessarily have a math disorder. Dyscalculia is characterized by persistent deficits that interfere with academic and daily functioning.
- A student's math performance alone is not sufficient to determine if they have dyscalculia or if they are underachieving for other reasons; rather, it is necessary to understand the student's unique learning profile of math skills and related cognitive strengths and weaknesses.[23]
- Interpret broad math scores cautiously. Relying on a broad math score, such as a math composite score or a math problem solving subtest score, may mask areas of weakness.[25] Error analysis is important for identifying specific areas of impairment and to plan intervention.[6]
- Individuals with dyscalculia show persistent impairment in one or more domain-specific math skills.[40, 43] According to some studies, dyscalculia is characterized by a core deficit in symbolic and nonsymbolic number sense;[16, 21] however, other studies do not support a core deficit for identifying dyscalculia.[35]
- Cognitive impairments in dyscalculia tend to vary as a function of comorbidity, severity of the disorder, age, and other factors.[40] Cognitive markers for dyscalculia include deficits in processing speed, rapid automatized naming, working memory, and/or executive functions.[32, 33, 40] Impairments in phonological processing can also contribute to difficulties with arithmetic and math fact retrieval among students with dyscalculia.[36] Students with dyscalculia tend to show difficulties with nonverbal/spatial reasoning, and it can be clinically meaningful to compare performance on measures of verbal and nonverbal reasoning.[44]

Pearson Dyscalculia Toolkit

The Pearson dyscalculia toolkit includes clinical and classroom resources for screening, assessment, intervention, and progress monitoring. To assist the varied groups of professionals who support individuals with dyscalculia, these tools can be used across respective professional groups and user qualification levels (B and C).

In addition to the products listed in the dyscalculia toolkit, other tools may be helpful to consider. A complete list of math tools for screening, assessment, intervention, and progress monitoring from Pearson Clinical Assessment is available here.

Screening Tools

Screening measures do not diagnose a condition. Rather, individuals who show risk on a screener typically require further evaluation and/or early intervention.

The Pearson toolkit for dyscalculia screening includes the following measures:

- Kaufman Test of Educational Achievement (3rd ed.; KTEA–3) Brief Form[28]
- Wide Range Achievement Test (5th ed.; WRAT5)[50]

The **KTEA–3 Brief Form** is used to screen for weaknesses in reading, writing, and mathematics and to obtain a general estimate of academic achievement for Grades PK–12+ (ages 4–25).[28] Two math subtests, Math Computation and Math Concepts & Applications, contribute to a Math composite score. All standard scores from subtests administered using the Brief Form can be applied to either Form A or Form B of the KTEA–3 Comprehensive Form.

The **WRAT5** is a widely used screening test of reading, spelling, and math skills in individuals ages 5–85+ years (Grades K–12+).[50] The WRAT5 includes a Math Computation subtest.

For the math measures included in both the KTEA-3 Brief and the WRAT5, the clinical validity data reported in the respective test manuals indicate that students with dyscalculia/SLD-Math performed significantly lower than the matched control group with large effect sizes observed. The Area Under the Curve (AUC) estimates for the KTEA-3 Brief and WRAT-5 were computed post-publication based on the clinical studies reported in the test manuals.

Reliability refers to the accuracy, consistency, and stability of test scores across situations. Reliability coefficients ≥ .90 are considered excellent.
Effect size refers to the magnitude of the difference in test performance between the SLD-Math/dyscalculia group and the control group. Large effect sizes are ≥ .80.
AUC is a combined measure of sensitivity and specificity and the industry standard criterion for evaluating the quality of a screening instrument. Values ≥ .90 are excellent; ≥ .80 are good.
Sensitivity is a measure of a screener's true positive rate.
Specificity indicates the true negative rate.
Sensitivity and specificity are inversely proportional, which means that as sensitivity increases, specificity decreases and vice versa.

Table 3 summarizes the reliability coefficients, clinical validity data, and administration time for the dyscalculia screening measures. The AUC estimates range from .81 to .95 indicating good-to-excellent accuracy in differentiating individuals with and without dyscalculia.

Table 3. Technical Characteristics of Dyscalculia Screening Measures

Test	Grade/age	Score	Mean reliability	Effect size	AUC	Admin. time (min.)
KTEA-3 Brief Form	K–12+ Ages 5–25	Math composite	.97 ★	2.26 ★	.95 ★	15–34 ★
	K–12+ Ages 5–25	Math Computation subtest	.95 ★	1.97 ★	.93 ★	7–17 ★
	PK–12+ Ages 4–25	Math Concepts & Applications subtest	.96 ★	1.99 ★	.91 ★	6–17 ★
WRAT5	K–12+ Ages 5–89+	Math Computation subtest	.91 ★	1.19 ★	.81 ★	≤15 ★

Note. Data were derived from age-based standard scores. Split-half reliability is reported. A full gold star indicates an excellent result; a half gold star indicates a good result.

Math Screener vs. Dyscalculia Screener

Test developers must provide data that support the use of a test for each intended use (Standard 12.2).[2] Data that support the use of a test as a dyscalculia screener include AUC, sensitivity/specificity, and clinical effect size. A test that only provides validity evidence for predicting or estimating math skills is a math screener. Math tests vary in how well they detect risk for dyscalculia. As part of a dyscalculia screening process, individuals who perform poorly on a math screener should also be given an empirically validated dyscalculia screening test.

Diagnostic Assessment Tools

The diagnostic process for specific learning disability (SLD) identification typically involves three steps:

Step 1: Rule out other potential causes of learning difficulties including pervasive or specific developmental disabilities, intellectual disability (intellectual developmental disorder), vision or hearing difficulties, socioemotional or cultural/linguistic factors, etc.

Step 2: Assess learning profiles for specific learning disabilities and common comorbid conditions.

Step 3: Make a differential diagnosis.

Due to its heterogeneous nature, a rigorous process approach to the diagnosis of dyscalculia is especially important, in addition to general best practices in assessment. A process approach involves making inferences about possible cognitive deficits and relies upon error analysis to test inferences and identify patterns of performance.

Assessment of Academic Achievement

To support this process, the Pearson dyscalculia toolkit includes the following assessments of mathematics skills.

- KeyMath-3 Diagnostic Assessment[13]
- KTEA-3 Comprehensive Form[26]
- Wechsler Individual Achievement Test (4th ed.; WIAT-4)[38]
- Process Assessment of the Learner (2nd ed.; PAL-II) Math[7]

The key features of each of these assessments are summarized in Table 4.

Table 4. Key Features of Diagnostic Math Assessments

Test	Publication	Grade/age	Form	Admin./scoring options
KeyMath-3 Diagnostic Assessment	2007	K–12+ 4:6–21	2 parallel forms	Hand score
KTEA-3 Comprehensive Form	2014	PK–12+ 4–25	2 parallel forms	Hand score Q-global Q-interactive
WIAT-4	2020	PK–12+ 4–50	1 form	Hand score Q-global Q-interactive
PAL–II Math	2007	K–6	1 form	Hand score

The **KeyMath-3 Diagnostic Assessment** is a norm-referenced measure of essential mathematical concepts and skills that is aligned with math curriculum standards and linked to the KeyMath–3 Essential Resources companion instructional program.[13, 15] The clinical validity data indicate that the dyscalculia (SLD-Math) group scored on average about 15 standard score points (i.e., 1 *SD*) below the population mean, and all mean score differences were statistically significant and quite large.[14]

The **KTEA-3 Comprehensive Form** is designed to provide information about normative and personal strengths and weaknesses in math, reading, writing, oral language, and specific processing areas relevant to academic learning.[26] The KTEA–3 assessment information may be used to make eligibility, placement, and diagnostic decisions; plan intervention; and monitor progress over time. The clinical validity data indicate that the dyscalculia (SLD-Math) group scored significantly ($p < .01$) lower than the matched control group on all math measures with large effect sizes observed.[27]

The **WIAT-4** provides information about normative strengths and weaknesses in math, reading, writing, and oral language and specific processing areas relevant to academic learning.[38] Results obtained from the WIAT-4 can be used to inform decisions regarding eligibility for educational services, educational placement, or a diagnosis of a specific learning disability, and the results include suggestions for instructional goals and intervention activities. According to the clinical validity data, the dyscalculia (SLD-Math) group scored significantly ($p < .01$) lower than the matched control group on all math measures with large effect sizes observed.[9]

The **PAL–II Math** is designed to measure math-related processes to facilitate the differential diagnosis of dyscalculia and to link assessment results with targeted interventions.[7] The PAL-II Revised User Guide for Math explains screening and assessment procedures for Tier I: Screen to intervene, Tier II: Problem solving consultation, and Tier III: Diagnosis and specialized instruction for dyscalculia.[8]

Assessment of Intellectual and Executive Functioning

The Pearson toolkit for dyscalculia evaluations also includes tests of intellectual and executive functioning. Within the context of a dyscalculia evaluation, tests of intellectual functioning are used for the following purposes:

- To better understand the unique learning profile of individuals with math learning difficulties.
- To develop individualized approaches to intervention that consider areas of strengths and weaknesses.
- To identify dyscalculia using a pattern of strengths and weaknesses (PSW) approach, whereby individuals with dyslexia show consistency between areas of cognitive processing weakness and academic weakness coupled with a significant discrepancy between areas of cognitive processing strength and cognitive processing weakness or by using an ability-achievement discrepancy (AAD) approach.

The Pearson dyscalculia toolkit includes several suggested tests of intellectual and executive functioning for practitioners with varying qualification levels (qualification criteria are provided at pearsonassessments.com):

Qualification Level C

- Differential Ability Scales™ (2nd ed.; DAS™–II)[19]
- Kaufman Assessment Battery for Children (2nd ed.) Normative Update (KABC™–II NU)[29]
- NEPSY® (2nd ed.; NEPSY–II)[31]
- Wechsler Adult Intelligence Scale® (4th ed.; WAIS®–IV)[46]
- Wechsler Intelligence Scale for Children® (5th ed.; WISC®–V)[48]
- Wechsler Preschool and Primary Scale of Intelligence® (4th ed.; WPPSI®–IV)[47]
- Wide Range Assessment of Memory and Learning (3rd ed.; WRAML™3)[1]

Qualification Level B

- Brown Executive Function/Attention Scales™ (Brown EF/A Scales™)[11]
- Delis Rating of Executive Functions (D-REF)[17]
- Kaufman Brief Intelligence Test™ (2nd ed.) Revised (KBIT™-2 Revised)[30]
- Raven's® 2 Progressive Matrices Clinical Edition (Raven's 2)[42]

The **WISC–V** is one of the most used school-age tests of intellectual functioning. The WISC–V is linked with the WIAT-4 and the KTEA–3, and it includes measures that differentiate individuals with dyscalculia (SLD-Math) from matched controls. The clinical validity data[49] indicate significant difficulties among the dyscalculia group on many subtests, with the largest effect sizes observed for Visual Puzzles and Arithmetic. The mean scores for the dyscalculia group were significantly ($p < .05$) lower than those of the matched control group for all primary and ancillary index scores except the Working Memory Index, with the largest effect sizes observed for the Quantitative Reasoning Index (QRI), Nonverbal Index (NVI), and Visual Spatial Index (VSI), indicating difficulties with quantitative, conceptual, and spatial reasoning abilities. Global index scores (FSIQ, GAI) were significantly lower ($p < .01$) and showed large effects as well.

A diagnosis of dyscalculia is based on a convergence of evidence gathered from multiple sources, including observation/interview, review of completed work, and norm-referenced assessment data.

To conduct a differential diagnosis, a comprehensive evaluation (see Assessment for Intervention section for rationale) is recommended and may be required in some settings. U.S. federal legislation (IDEA) allows for use of the term dyscalculia if it is supported by a comprehensive evaluation for a specific learning disability.[53] A single test score is not sufficient to identify or diagnose dyscalculia. Avoid using stringent cut points and consider evidence gathered from multiple sources to determine whether a student shows a persistent pattern of difficulties characteristic of dyscalculia.

Table 5 lists key skill areas relevant to a dyscalculia evaluation and suggested corresponding measures. Although the list of measures is not exhaustive, it is intended to provide practitioners with suggested tests and subtests to consider. A comprehensive evaluation will include additional skills and abilities beyond the hallmark indicators of dyscalculia shown in Table 5.

Table 5. Dyscalculia Assessment Constructs and Related Measures

Domain-specific skills and abilities	WIAT-4	KTEA-3	KeyMath-3/PAL-II
Symbolic number sense	Math Problem Solving, error analysis: Comparing/ordering numerals; Interpret number line	Math Concepts & Applications, error analysis: Number concepts	KeyMath-3 Numeration
Non-symbolic number sense/finger sense	Math Problem Solving, error analysis: Basic concepts	Math Concepts & Applications, error analysis: Number concepts	KeyMath-3 Numeration
Math fact retrieval	Math Fluency–Addition; –Subtraction; –Multiplication	Math Fluency	PAL-II Fact Retrieval
Math computation	Numerical Operations	Math Computation	KeyMath-3 Addition and Subtraction; Multiplication and Division; Mental Computation and Estimation
Math problem solving	Math Problem Solving	Math Concepts & Applications	KeyMath-3 Foundations of Problem Solving; Applied Problem Solving
Conceptualizing time and space	Math Problem Solving, error analysis: *Time; Measuring an Object; etc.*	Math Concepts & Applications, error analysis: *Time; Geometry; Measurement; etc.*	KeyMath-3 Geometry; Measurement
Domain-general cognitive abilities	**Wechsler**	**Kaufman**	**Other**
Executive functions: Attention, inhibition, updating, shifting, etc.			Brown Executive Function/ Attention Scales Delis Rating of Executive Functions D-KEFS Color-Word Inhibition; Tower; Trail-Making Test NEPSY-II Animal Sorting; Clocks; Design Fluency; Auditory Attention and Response Set; Inhibition
Visual-spatial perception/working memory	WPPSI-IV Visual Spatial Index (VSI); Working Memory Index WISC-V VSI; Picture Span WAIS-IV Perceptual Reasoning Index	KABC-II NU Simultaneous/Gv	DAS-II Recall of Designs NEPSY-II Arrows; Block Construction; Geometric Puzzles; Picture Puzzles PAL-II Spatial Working Memory WRAML3 Visual Working Memory
Auditory verbal working memory	WPPSI-IV and WAIS-IV Working Memory Index WISC-V Auditory Working Memory Index	KABC-II NU Word Order; Number Recall	DAS-II Recall of Digits; Recall of Sequential Order PAL-II Quantitative Working Memory WRAML3 Verbal Working Memory
Processing speed	WISC-V and WAIS-IV: Processing Speed Index		DAS-II Speed of Information Processing
Rapid automatized naming (RAN)	WISC-V Naming Speed Literacy; Naming Speed Quantity	KTEA-3 Object Naming Fluency; Letter Naming Fluency	DAS-II Rapid Naming PAL-II RAN (Single/ Double Digits)
Phonological processing	WIAT-4 Phonemic Proficiency	KTEA-3 Phonological Processing	NEPSY-II Phonological Processing
Nonverbal reasoning	WPPSI-IV, WISC-V and WAIS-IV: Nonverbal Index WISC-V Fluid Reasoning; Quantitative Reasoning	KABC-II NU Pattern Reasoning KBIT-2 Revised: Riddles	DAS-II Matrices; Sequential and Quantitative Reasoning Raven's 2
Verbal comprehension and reasoning	WPPSI-IV, WISC-V, and WAIS-IV: Verbal Comprehension Index	KABC-II NU Knowledge/Gc KBIT-2 Revised: Riddles	DAS-II Verbal Similarities NEPSY-II Comprehension of Instructions

Intervention Tools

The following intervention resources are included in the Pearson Dyscalculia Toolkit:

- KeyMath-3 Essential Resources[15]
- KTEA-3 teaching objectives and intervention statements
- WIAT-4 intervention goal statements
- PAL-II Revised User Guide for Math[8]

The **KeyMath-3 Essential Resources** is a comprehensive instructional program organized around the same curriculum framework as the KeyMath-3 Diagnostic Assessment.[15] The program includes lessons, practice sheets, and brief tests for students with math difficulties in Grades K–5 and beyond. Instruction is structured according to 10 distinct content strands: Numeration, Algebra, Geometry, Measurement, Data Analysis and Probability, Mental Computation and Estimation, Addition and Subtraction, and Multiplication and Division.

The **KTEA–3 and WIAT-4 score reports** in Q-global® and Q-interactive® include customizable teaching objectives and intervention suggestions based on error analysis results for each of the math subtests. Based on the examinee's error analysis results, the KTEA–3 provides customizable teaching objectives and intervention suggestions, and the WIAT-4 provides customizable intervention goal statements. These statements include instructional recommendations for writing annual goals and short-term objectives to improve performance in particular skill areas.

The **PAL-II Revised User Guide for Math** provides guidance on linking assessment to intervention and describes math intervention activities for students in Grades K–6.[8]

Progress Monitoring Tools

The following progress monitoring tools are included in the Pearson Dyscalculia Toolkit:

- aimswebPlus
- Growth Scale Values (GSVs) for KeyMath-3, WIAT-4, and KTEA-3
- Progress Monitoring Assistant for WIAT-4
- Review360

aimswebPlus includes early numeracy and math measures, available in English and Spanish, that can be administered from Pre-Kindergarten through Grade 12 in the fall, winter, and spring. Summer forms are also available for grades K–12. Each of the progress monitoring measures can be completed in 1-5 minutes. To obtain a math composite score (grades K–12), three measures are administered. One of those measures is Concepts & Applications (CA), which is administered at every grade level. For CA, the student mentally solves various kinds of applied math problems.

Growth scale values (GSVs), which are provided for the KeyMath-3, KTEA-3, and WIAT-4, are preferred over standard scores and percentile ranks for measuring growth because GSVs reflect the examinee's absolute (rather than relative) level of performance. GSVs are useful for comparing an examinee's performance on a particular subtest or composite relative to their own past performance, whereas standard scores and percentile ranks are useful for comparing performance relative to peers.

The **Progress Monitoring Assistant**[10] software application is provided for the WIAT-4 to analyze changes in an examinee's GSVs and standard scores over time.

Review360 provides several progress monitoring plans within the application. The Academic Progress Plan and Student Support Team plans offer math goal creation/selection, flexible data collection strategies, and robust reporting for any math needs in general and/or special education contexts.

Common Questions

What causes dyscalculia?

Dyscalculia tends to run in families, with 5–10 times higher risk in first-degree relatives.[3] Developmental dyscalculia is attributed to the dysfunction of mathematical processes and areas in the brain; however, further research is needed to better understand this disorder and its etiology.[12]

Is the term dyscalculia synonymous with a specific learning disability in mathematics (SLD-Math)?

To qualify students for services in educational settings, the terms dyscalculia and SLD-Math are typically used synonymously. U.S. federal law (IDEA) specifies mathematics as one of the areas in which students with learning disabilities may be affected, and the term dyscalculia can be used when identifying students with mathematics impairments. However, practitioners are strongly encouraged to define how terms are being used when communicating with families, educators, and other professionals. The classifications provided by the Individuals with Disabilities Education Act,[24] the Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.; DSM-5-TR),[3] and International Statistical Classification of Diseases and Related Health Problems (11th ed.; ICD-11)[51] are helpful for determining eligibility for services and for guiding high-level decisions about placement or scope of intervention; however, the pseudo-categories established by these classification systems are flawed and lack classification rigor.[41] A diagnosis of dyscalculia or SLD-Math is not sufficient to guide intervention. To develop an effective treatment plan, it is necessary to understand the individual's specific learning profile and the factors contributing to the impairments, regardless of classification terminology. Individuals can meet criteria for dyscalculia/SLD-Math for a variety of reasons with heterogeneous symptoms and levels of impairment.

Is math anxiety or poor math performance synonymous with dyscalculia?

No, not all individuals with math difficulties or math anxiety have dyscalculia. Math difficulties manifest in a variety of ways and for different reasons.[34] A comprehensive evaluation that includes a range of measures is recommended for differential diagnosis.

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