



The
Access Center
Improving Outcomes for All Students K-8

Strategies to Improve Access to the General Education Curriculum

Table of Contents

Strategies to Improve Access to the General Education Curriculum	2
Instructional Strategies	4
Differentiated Instruction	4
Computer Assisted Instruction (CAI)	5
Concrete, Representations (Semi concrete), and Abstract Sequence of Mathematics Instruction (CRA or CSA)	6
Grouping Strategies	7
Grouping Strategies - Peer Assisted Learning Strategies (PALS)	8
Direct Instruction	9
Learning Strategies	10
Learning Strategies	10
Mnemonics	11
Materials and Media	12
Adapted Books/Texts	12
Literacy Rich Environments	13
Professional Collaboration	14
Assessment	15
Curriculum Based Measurement (CBM)	15
Functional Behavior Assessments (FBA)	16
References	17
Differentiated Instruction	17
Computer Assisted Instruction	17
Concrete, Representations (Semiconcrete), and Abstract Sequence of Mathematics Instruction (CRA or CSA)	18
Grouping Strategies	18
Peer Assisted Learning Strategies (PALS)	19
Professional Collaboration	19
Learning Strategies	20
Mnemonics	20
Adapted Books and Text	21
Literacy Rich Environments	21
Curriculum-Based Measurement	22
Functional Behavior Assessments	22

Strategies to Improve Access to the General Education Curriculum

Education professionals increasingly focus on identifying programs, practices, and strategies that are *research based*. To be considered as the highest (“gold”) standard of *research based*, educational practices must have evidence (a) that is supported by rigorous and scientific data (high quality) and (b) that has a body of studies that demonstrate positive outcomes (high quantity). The No Child Left Behind (NCLB) Act passed in 2001 (www.nclb.gov) and many federal grant programs call on educators to use scientifically-based research to drive their decisions about educational interventions.

To be considered *scientifically based*, research should be objective, empirical, replicable, have valid and reliable data, use particular research designs, and use rigorous data analysis (See Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User-Friendly Guide. Available at: www.ed.gov/rschstat/research/pubs/rigorous/vid/guide_pg3.html).

In general, more research needs to be conducted that uses the “gold standard” of scientific rigor. In addition, more careful review of existing research needs to occur in order to evaluate and synthesize evidence relating to programs and practices. As an example, the U.S. Department of Education has funded the What Works Clearinghouse (www.w-w-c.org) to serve as an independent source of scientific evidence of what works in education. However, such careful and systematic reviews take an enormous amount of time and manpower.

In the meantime, a body of research does suggest that specific programs and practices are effective with particular students. Increasing exposure to such research-supported instructional methods and practices, materials and media, and supports and accommodations will help students with disabilities effectively engage in learning general education curriculum content.

The strategies that appear in this chart have varying levels of research support. The Access Center classifies strategies on a continuum depending on their research base. “Green light” strategies are evidenced based practices while “yellow light” strategies are promising practices but require further validation and thus should be used with caution. Analysts at the Access Center use several approaches for classifying the level of research that supports each strategy. For some strategies we borrowed guidelines used for the Current Practice Alerts developed by the Division of Learning Disabilities and the Division of Research of the Council for Exceptional Children (CEC). Where we highlight strategies that were not included in CEC’s Current Practice Alerts, we rely on the research continuum developed by the Access Center to classify practices and on experts who bring their knowledge of research-based practices.

(http://www.k8accesscenter.org/training_resources/researchapproach.asp)

The Access Center identifies the approach used for classifying each strategy in the chart.

To assist state and local technical assistance providers and administrators in selecting research-supported practices, the professionals at the Access Center compiled information on strategies in the following areas: Instructional Methods and Practices, Media and Materials, Supports and Accommodations, and Assessment. The following information is provided for each research-supported practice:

- *Student Characteristics Addressed*: specifies the types of challenges the strategy targets
- *Practice Description*: gives specific information regarding the use of the strategy

- *How It Improves Access:* explains how effective implementation can improve access to the general education curriculum for students with disabilities
- *Supporting Research:* identifies sources of findings on the practice
- *Implications for Practice:* outlines considerations for implementation, including costs
- *Sources of Additional Information:* lists additional websites and resources for more information about the practice


In addition, several of the research-supported practices include links to content-area “applications.” These applications expand on the practice and provide an explanation of how it can be used within a particular content area.

The Access Center will continue to expand this list and provide additional information about these and other research-supported interventions on our website (www.k8accesscenter.org/) as they become available. Check back frequently for more resources and information about effective practices to improve access to the general education curriculum for students with disabilities.

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Differentiated Instruction

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p> <p>Application to -</p> <ul style="list-style-type: none"> ▪ Math ▪ Reading ▪ Writing ▪ Science 	<p>Differentiated instruction –</p> <ul style="list-style-type: none"> ▪ addresses student readiness, which includes prior knowledge and skills ▪ addresses student interest ▪ addresses a student's learning profile, which includes learning style, environmental factors that affect the student's learning, and the student's grouping preferences 	<p>Teachers diagnose student readiness, interest, and learning profile.</p> <p>Instruction incorporates specific strategies that meet the needs of students and are based on the curriculum being presented.</p> <p>On-going assessment allows teachers to adjust instruction in response to student needs.</p>	<p>Enables students to access information using modalities that best meet their needs.</p> <p>Information is presented at students' individual readiness levels.</p>	<p>Requires time for planning and implementation.</p> <p>May require support from administration and co-teachers.</p> <p>May require a high level of student investment.</p>

Supporting Research

Qualitative and meta-analysis research indicate:


That students in differentiated classrooms achieve better outcomes than students in classrooms without differentiation (Csikszentmihalyi, Rathunde, & Whalen, 1993; Tomlinson, Brighton, Hertberg, Callahan, Moon, Brimijoin, et al., 2003)

When instructional materials are differentiated to meet student needs, interests, and readiness, academic gains increase (Kulik & Kulik, 1991; Lou, Abrami, Spence, Poulsen, Chambers, & d'Apollonia, 1996).

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Computer Assisted Instruction (CAI)

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p> <p>Application to -</p> <ul style="list-style-type: none"> ▪ Math ▪ Reading ▪ Writing ▪ Science 	<p>Children with –</p> <p>Fine motor challenges</p> <p>Attention deficit</p> <p>Minimal organizational strategies</p> <p>Difficulty decoding and comprehending text</p> <p>Communication delays</p> <p>Weak problem-solving skills</p> <p>Difficulty with abstract concepts</p>	<p>Computer programs or high-tech equipment provide content instruction to students to enable them to meet standards and goals.</p> <p>Sample features–</p> <p>Independent instruction for student</p> <p>May measure student skill and progress</p> <p>Interactive</p> <p>Immediate feedback</p>	<p>Allows multiple means of interacting with curricular materials</p> <p>Allows teachers to individualize lessons to meet children’s specific goals while helping them meet state and local standards</p>	<p>Allows great flexibility in use because it is not subject specific</p> <p>Requires professional development for use in classrooms</p> <p>Requires purchase of technology and software if not currently available</p> <p>Requires that individuals with expertise be available for trouble shooting</p> <p>Requires time for teacher planning and instructing students to use software</p>

Supporting Research

CAI may be an academic motivator for students with disabilities (Hitchcock & Noonan, 2000).

CAI increases wait time and builds on mastered skills (Hitchcock & Noonan, 2000; Zimmerman, 1998).


Effectiveness is attributed to the higher interaction required for responses and active learning (Lahm, 1996).

Varying results of effectiveness from research (Kroesbergen & Van Luit, 2003)

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Concrete, Representations (Semi concrete), and Abstract Sequence of Mathematics Instruction (CRA or CSA)

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p> <p>Application to -</p> <ul style="list-style-type: none"> ▪ Math 	<p>Students who are in general education, at risk and/or in special education</p> <p>Students with difficulties in these areas—</p> <ul style="list-style-type: none"> • using symbols and abstract mathematical concepts • processing information • sustaining attention to task • monitoring and self-regulating • performing basic math skills • reasoning and • using problem-solving skills 	<p>Three phases—</p> <ul style="list-style-type: none"> • Concrete phase of mathematical concept uses hands-on manipulatives • Representations phase uses pictorial display • Abstract phase uses numerical symbols or algebraic letters of abstract mathematical concepts <p>Repetition of different types of manipulatives or representations of same concept</p> <p>Graduated and conceptually supported framework for creating connection between C–R–A levels of understanding</p>	<p>Enables children to—</p> <ul style="list-style-type: none"> • retrieve background knowledge and • become confident with an approach to reason <p>Provides a path for more complex problem-solving situations</p> <p>Addresses student learning styles by providing visual, tactile, and kinesthetic experiences</p> <p>Allows group or individual instruction</p> <p>Allows students to move in a structured way from concrete to abstract concepts through pictorial representations such as charts, graphs, symbols, and diagrams</p> <p>Facilitates abstract reasoning with numerical symbols</p>	<p>May require purchase of commercial materials (e.g., number cubes, fraction bars, geometric figures)</p> <p>May require time to practice repetition of sequence to establish understanding of concept</p> <p>May require professional development for teachers to learn to model concrete and visual materials establishing links to abstract concepts</p>

Supporting Research

Builds a foundation with structured concrete materials for developing concepts in number sense, geometry, statistics, story problems, and measurement (Bruni & Silverman, 1986; NCTM, 2000)

Develops more precise and comprehensive mental representations (Suydam & Higgins, 1977)

Allows students to understand numerical symbols and abstract equations at a concrete level (Devlin, 2000; Maccini & Gagnon, 2000)

Facilitates learning place value (Peterson, Mercer, O'Shea, 1988)


Facilitates development of computation skills (Mastropieri, Scruggs, & Shiah, 1991)

Promotes acquisition and retention of arithmetic facts and mathematics concepts (Miller & Mercer, 1993)

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Grouping Strategies

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p style="font-size: small;">Access Center Research Continuum</p>	<p>Children with –</p> <p>Communication delays</p> <p>Delays in mathematical concepts</p> <p>Difficulty decoding and comprehending text</p> <p>Weak problem-solving skills</p> <p>Difficulty with abstract concepts</p> <p>Lack of organizational skills</p> <p>Lack of attention</p>	<p>After assessing students' needs, teachers plan activities using various types of groups to ensure that students' needs and interests are targeted</p> <p>Example groupings include pairing, smaller teacher-led groups, and multiple grouping (vary the grouping from day to day) formats. .</p>	<p>Enables teachers to use various types of groups to ensure that children have appropriate models and individual attention to facilitate access</p> <p>Teaches children appropriate social skills</p> <p>Fosters student independence and collaboration skills</p> <p>Allows individualization by teacher</p>	<p>Requires sophisticated classroom management skills</p> <p>Requires time to plan and evaluate with other team members (who may be working with groups or individuals)</p>

Supporting Research

Flexible grouping allows teachers to meet the needs of specific children while targeting interests (NCREL)


Groups provide opportunities for improved social and academic interaction (Johnson & Johnson, 2000; Vaughn et al., 2001)

In comparison studies, students in alternative groupings (compared with traditional whole class grouping) for reading demonstrated higher success rates for students with disabilities (Elbaum et al., 2000)

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Grouping Strategies - Peer Assisted Learning Strategies (PALS)

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum and expert recommendations</p>	<p>Children with –</p> <p>Difficulty decoding and comprehending text</p> <p>Communication delays</p> <p>Delays in mathematical concepts</p> <p>Difficulty with abstract concepts</p> <p>Noncompliant behaviors</p> <p>Aggressive behaviors</p> <p>Lack of attention</p> <p>Lack of organizational skills</p>	<p>Students interact through “coach/ player” pairings in structured cooperative-learning activities.</p> <p>Students support each other through frequent oral interaction, feedback, and reinforcement.</p> <p>Programs are available in reading for grades preschool–6 and mathematics for grades K–6.</p>	<p>Groups students with and without disabilities to assist with comprehension of general education content</p> <p>Promotes meaningful social interaction between peers with and without disabilities</p>	<p>Provides a complement to current reading and mathematics curricula</p> <p>Requires a set period of time for implementation: 25–35 mins/2 or 3 times a week</p> <p>Requires professional development (workshop training and teacher manual)</p>

Supporting Research

PALS is approved by the U.S. Department of Education’s Program Effectiveness Panel for Inclusion in the National Diffusion Network on effective educational practices (John F. Kennedy Center for Research on Human Development, 1999).


Improves student test performance on a number of reading measures (Fuchs, Fuchs, Mathes, & Simmons, 1997; Fuchs, & Fuchs, 1998).

PALS enables students to make connections with abstract mathematical concepts (Fuchs, Fuchs, 01; Fuchs et al., 1997).

Instructional Strategies

Instructional Strategies – Methods that can be used to deliver a variety of content objectives. How a course of study/curriculum should be taught.

Direct Instruction

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum and expert recommendations</p> <ul style="list-style-type: none"> ▪ Math ▪ Reading ▪ Spelling ▪ Language Arts 	<p>At risk students including those students with disadvantaging conditions, including students with disabilities and those from various social and economic levels.</p> <p>Struggling readers who have difficulty decoding and comprehending text</p> <p>Primarily a pre-K-6 program, however also proven effective with secondary, adult special education and remedial students</p>	<p>An explicit, teacher-directed instructional model.</p> <p>The focus of DI is curriculum design and instructional delivery</p> <p>Major program features include:</p> <ul style="list-style-type: none"> • research tested curriculum • systematic and explicit instruction • coaches/facilitators • rapid pace • achievement grouping • scripted class sessions • intense, constant student interaction • teaching to mastery • frequent assessments 	<p>Access to the general education curriculum is of little value unless ALL students have the opportunity to gain the skills necessary for academic success.</p> <p>Direct Instruction has been proven to be an effective strategy in improving the reading skills of struggling readers, regardless of reason. Since reading is the foundational skill for all learning, the ability to read well is essential for ALL students' success in the general education curriculum.</p> <p>Direct instruction has been proven to be an effective instructional strategy in reading, language arts, spelling and math; all fundamental skills required for success in the general curriculum.</p>	<p>Will require the purchase of a commercial program and materials based on this instructional model.</p> <p>Will require professional development and implementation supports to insure fidelity of implementation.</p> <p>Teachers and support personnel must be prepared for the program's fast pace and the structured, repetitive nature of the program.</p> <p>Must have teacher buy-in. Teachers must be fully informed of the research that supports Direct Instruction as being a proven effective instructional model.</p> <p>May require in-class coaches for implementation support.</p>

Supporting Research

Adams, G. & Engleman S. (1996). *Research on Direct Instruction: 25 Years Beyond Distar*. Seattle: Educational Achievement Systems.

American Federation of Teachers (1997). *Raising Student Achievement: A Resource Guide for Improving Low Performing Schools*. Washington: AFT.


American Federations of Teachers (1998). *Building on the Best: Learning from What Works*. Washington: AFT.

Learning Strategies

Learning Strategies – Techniques, principles, or rules that facilitate the acquisition, manipulation, integration, storage, and retrieval of information across situations and settings. (Alley, G.R., & Deshler, D.D. Teaching the learning disabled adolescent: Strategies and Methods. Denver: Love, 1979).

Students do this.

Learning Strategies

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum and expert recommendations</p> <p>Application to -</p> <ul style="list-style-type: none"> ▪ Math 	<p>Children with –</p> <p>Difficulty decoding and comprehending text</p> <p>Communication delays</p> <p>Lack of organizational skills</p> <p>Weak problem-solving skills</p> <p>Difficulty with abstract concepts</p> <p>Delays in mathematical concepts</p> <p>Short- and long-term memory problems</p>	<p>Techniques, principles, or rules help students acquire, store, use, and retrieve information in various settings.</p> <p>According to NICHY (1997a), learning strategies generally fall into two categories–</p> <p>– Cognitive (i.e., task-specific, such as taking notes, making an outline, and asking questions</p> <p>– Metacognitive (i.e., self-regulation, such as goal-setting, self-monitoring, and self-questioning).</p>	<p>Enables students to learn and remember key concepts, thus enabling students to actively engage in curriculum content</p> <p>Helps students learn how to learn and allows them to become independent learners</p> <p>Increases students' confidence in their academic abilities</p>	<p>Requires professional development (e.g., different learning strategies, their benefits and uses)</p> <p>Requires teachers to plan time to teach these learning strategies</p> <p>Several models for teaching learning strategies are discussed in the literature (e.g., SIM, self-regulated learners, and cognitive instruction)</p>

Supporting Research

Students show improved independence in completing tasks, including improved reading comprehension (Alley & Deshler, 1979).


Students better understand individual learning process (NICHY, 1997a)

Students give more attention to learning (NICHY, 1997a)

Learning Strategies

Learning Strategies – Techniques, principles, or rules that facilitate the acquisition, manipulation, integration, storage, and retrieval of information across situations and settings. (Alley, G.R., & Deshler, D.D. Teaching the learning disabled adolescent: Strategies and Methods. Denver: Love, 1979).

Mnemonics

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 CEC Guidelines	Children with – Short- and long-term memory problems Difficulty with abstract problems Difficulty with decoding Lack of organizational skills	Mnemonics improves memory by linking new information to current knowledge through visual and verbal cues. Includes three methods– Keyword (linking new information to known words) Pegword (using rhyming word to represent number or order) Letter strategies (using acronyms and acrostics)	Gives students tools to encode information so they can retrieve it later Allows better understanding of subject-area content	Requires minimal professional development for teachers and minimal additional resources beyond initially learning the mnemonic strategies Use can be across multiple content areas (language arts, mathematics, science, foreign language, etc.)


Supporting Research

Strategy is effective for increasing comprehension test scores (Mastropieri, Sweda, & Scruggs, 2000; Uberti, Scruggs, & Mastropieri, 2003).

Gains have been shown on criterion-referenced tests and criterion-referenced measures (Swanson, 1999; Forness, Kavale, Blum, & Lloyd, 1997).

Materials and Media


Adapted Books/Texts

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p>	<p>Children with –</p> <ul style="list-style-type: none"> Difficulty decoding and comprehending text Communication delays Lack of organizational skills Gross/fine motor deficiencies Cognitive delays Visual impairments Lack of attention 	<p>Texts and general education materials are modified.</p> <p>Low-technology materials (e.g., stickers, fabric, glue, highlighting)</p> <p>High-technology materials (e.g., talking switches, communication devices, talking books software, textbooks on tape)</p>	<p>Students spend a large amount of time interacting with text, much of which is developmentally inappropriate or inaccessible to different types of learners.</p> <p>Adapted texts and books are used in the general education curriculum to allow the participation of students with disabilities</p>	<p>Requires teachers and specialists to identify specific goals and add adaptations to books or create adapted books to accommodate and individualize for students in classrooms</p> <p>Requires time to create and collaborate on books</p> <p>Can be expensive depending on the quantity and level of technology involved</p> <p>Requires time to teach children how to use adapted books and may need one-on-one or small-group support while learning</p>

Supporting Research


Student differences significantly affect how they perceive and process information (Curry, 2003).

Adapted texts allow more individuals to participate in the curriculum (Higgins, Boone, & Lovitt, 2002; Robinson, 2000).

Materials and Media				
Literacy Rich Environments				
Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p>	<p>Children with –</p> <p>Difficulty decoding and comprehending text</p> <p>Communication delays</p> <p>Lack of literacy-rich environment outside of school</p>	<p>Classroom environment ensures accessible literacy experiences through–</p> <p>Labels (pictorial and word)</p> <p>Large supplies of books</p> <p>Multiple writing opportunities (pencils/paper, computer, typewriter, etc.)</p> <p>Reading opportunities during school day</p> <p>Teachers engage in language and literacy activities throughout instruction.</p> <p>Students actively engage in reading and writing projects throughout the curriculum.</p>	<p>Provides students access to literacy by immersing them in an environment of print</p> <p>Provides students multiple opportunities for interaction with literacy (through words and books), which enables them to interact with the general education curriculum</p>	<p>Requires that teachers have time to set up the environment, such as labeling everything with pictures and words</p> <p>Requires resources to purchase materials, such as books and magazines</p>
<p>Supporting Research</p> <p>Opportunities to engage in reading and writing activities increase literacy skills when connected to the real-world experiences of students with disabilities (Katims & Pierce, 1995).</p> <p>Opportunities to explore literature and intentional instruction facilitate development (Gunn, Simmons, & Kameenui, 1995; Snow, Burns, & Griffin, 1999; Whitehurst, 2003).</p>				

Supports and Accommodations

Professional Collaboration

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p>	<p>Children with –</p> <p>Needs for related services provided by more than one specialist</p> <p>Needs for paraprofessional support</p> <p>Issues needing the expertise of more than one individual</p>	<p>Teachers and related service providers meet on a regular basis to problem solve, plan, and implement strategies to ensure that each student is able to participate in the general education curriculum.</p> <p>Collaboration partners vary depending on student need.</p> <p>Sample collaborators—</p> <ul style="list-style-type: none"> • Regular and special educators <p>Regular, special, and speech educators, occupational therapists, physical therapists, nurses, and psychologists</p>	<p>Creates communication and support among multiple service providers</p> <p>Enhances and builds on the student's access to the general education curriculum</p> <p>Ensures that all providers integrate their services with one another</p>	<p>Requires that teachers and related service providers communicate and send one message to parents and child</p> <p>Builds on partner strengths to ensure that lessons are accessible to students with disabilities</p> <p>Requires that time be built into the schedule for collaborative planning, implementation, and evaluation</p> <p>Requires that teachers be willing to share their space and welcome other professionals into their teaching</p> <p>Requires time and effort to build trust</p>


Supporting Research

Collaboration streamlines instruction, prevents removal of students from general education classrooms, and ensures the integration of goals and standards to create success within the curriculum (Flemming & Monda-Amaya, 2001; Friend & Cook, 2000).

Academic growth for students with severe emotional disabilities is attributed to more teacher attention, reduced teacher-pupil ratios, and more individual assistance provided through collaboration (Carter, 2000).

Assessment

Curriculum Based Measurement (CBM)

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p>	<p>Children with –</p> <p>Communication delays</p> <p>Delays in mathematical concepts</p> <p>Difficulty decoding and comprehending text</p> <p>Weak problem-solving skills</p> <p>Difficulty with abstract concepts</p> <p>Lack of organizational skills</p> <p>Lack of attention</p>	<p>CBM is a valid and reliable form of curriculum-based assessment.</p> <p>CBM monitors academic progress in basic skills with short (1–3 minute) probes of reading, spelling mathematics, and writing fluency.</p> <p>The student's progress is measured against self and class.</p> <p>CBM allows for data-based decision making through a multiple-step process involving testing, analysis, and planning.</p>	<p>Assesses students' progress toward year-end academic goal</p> <p>Monitors students on an ongoing basis, provides information about students' strengths and areas for improvement</p> <p>Allows teachers to recognize learning difficulties and make immediate instructional changes that meet students' needs</p>	<p>Allows teachers to easily track progress over time</p> <p>Allows teachers to evaluate effects of interventions</p> <p>Requires minimal time for teachers to learn CBM method</p> <p>Requires time to develop assessment probes and measures</p> <p>Computerized versions available</p>


Supporting Research

Students with disabilities demonstrated increased academic growth rates in reading with use of CBM assessments (Deno, Fuchs, Marston, & Shinn, 2001).

Students worked more quickly and accurately and became more active learners (Phillips, Fuchs, & Fuchs, 1994).

Assessment

Functional Behavior Assessments (FBA)

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Implications for Practice
 <p>Access Center Research Continuum</p>	<p>Children with –</p> <p>Noncompliant behaviors</p> <p>Aggressive behaviors</p> <p>Communication delays</p> <p>Weak problem-solving skills</p> <p>Lack of attention</p>	<p>Teachers and specialists select a target behavior then record the antecedent (incidents immediately before the targeted behavior), the behavior, and the consequence that occurs when the targeted behavior is demonstrated.</p> <p>Information collected from observations is used to create a positive behavioral support plan and environment.</p>	<p>Allows teachers to examine the environment and its effect on students, adapt their teaching behaviors and the environment to meet student needs</p> <p>Provides students with greater opportunities to participate in the general education curriculum</p>	<p>Requires time to watch and analyze behaviors</p> <p>Requires consistency in implementing functional behavior analysis (all observers must be active participants)</p>

Supporting Research

The OSEP 22nd annual report to Congress recommended its use as a means to individualizing to meet specific students' needs (OSEP, 2000; Miller, Tansy, & Hughes, 1998; Miller, 2001).

Functional Behavior Assessments (FBAs) are effective in reducing problem behaviors because they are aligned with the IEP process in monitoring the accomplishment of student goals (Shippen, Simpson, & Crites, 2003).

References

Differentiated Instruction

- Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success and failure*. New York: Cambridge University Press.
- Kulik, J., & Kulik, C. (1991). *Research on ability grouping: Historical and contemporary perspectives*. Storrs, CT: University of Connecticut, National Research Center on the Gifted and Talented. (RIC Document Reproduction Service No. ED 350 777).
- Lou, Y., Abrami, P., Spence, J., Poulsen, C., Chambers, B., & d'Apollonia, S. (1996). Within-class grouping: A meta-analysis. *Review of Educational Research*, 66, 423-458.
- Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., et al. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal of the Education of the Gifted*, 27, 119-145.

Web Resources

- The Access Center. (2004). *Enhancing Your Instructional Skills Through Differentiation*. Washington, DC: The Access Center. Available at http://www.k8accesscenter.org/training_resources/Presentations.asp#differentiation
- Hottlinx was developed by the University of Virginia. It provides strategies, lesson plans, unit plans, and assessments to support differentiated instruction. Available at <http://www.hottlinx.org/>

Computer Assisted Instruction

- Hauser, J., & Malouf, D.B. (1996). A federal perspective on special education technology. *Journal of Learning Disabilities*, 29(5), 504–512.
- Hitchcock C.H., & Noonan, M.J. (2000). Computer-assisted instruction of early academic skills. *Topics in Early Childhood Special Education*, 20(3), 145–159.
- Hutinger, P.L. (1996). Computer applications in programs for young children with disabilities: Recurring themes. *Focus on Autism and Other Developmental Disabilities*, 11(2) 105–115.
- Kroesbergen, E.H., & Van Luit, J.E.H. (2003). Mathematics interventions for children with special educational needs: A meta-analysis. *Remedial and Special Education*, 24, 97–115.
- Lahm, E. (1996). Software that engages young children with disabilities: A study of design features. *Focus on Autism and Other Developmental Disabilities*, 11(2), 115–125.
- Office of U.S. Special Education Programs (2000). *Twenty-second annual report to Congress*, (Chapter 3, pp. 37–48). Washington, DC: U.S. Department of Education
- Zimmerman, S.O. (1998). Problem-solving tasks on the microcomputer: A look at the performance of students with learning disabilities. *Journal of Learning Disabilities*, 21(10), 637–641.

Web Resources

- The Access Center: Improving Outcomes for All Students K – 8. Available at <http://www.k8accesscenter.org>. Go to Resource, then Universal Design.

- CAST**. Available at <http://www.cast.org/>

Concrete, Representations (Semiconcrete), and Abstract Sequence of Mathematics Instruction (CRA or CSA)

- Bruni, J.V., & Silverman, H.J. (1986). Developing concepts in probability and statistics - and much more. *Arithmetic Teacher* 33,34-37.
- Devlin, K. (2000). Finding your inner mathematician. *The Chronicle of Higher Education*, 46, B5.
- Maccini, P., & Gagnon, J. C. (2000). Best practices for teaching mathematics to secondary students with special needs. *Focus on Exceptional Children*, 32, 1–22.
- Maccini, P., McNaughton, E., & Ruhl, K. L. (2000). Algebra instruction for students with learning disabilities: Implications from a research review. *Learning Disability Quarterly*, 22, 113–126.
- Mastropieri, M. A., Scruggs, T. E., & Shiah, S. (1991). Mathematics instruction for learning disabled students: A review of research. *Learning Disabilities Research & Practice*, 6, 89–98.
- Miller, S. P., & Mercer, C. D. (1993). Using data to learn about concrete-semiconcrete-abstract instruction for students with math disabilities. *Learning Disabilities Research & Practice*, 8(2), 89-96.
- National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: NCTM, Inc.
- Peterson, S. K., Mercer, C. D., & O'Shea, L. (1988). Teaching learning disabled students place value using the concrete to abstract sequence. *Learning Disabilities Research*, 4 (1), 52-56.
- Suydam, M.N.; Higgins, J.L. 1977. *Activity-based learning in elementary school mathematics: recommendations from research*. Columbus, OH, ERIC Center for Science, Mathematics, and Environmental Education.

Grouping Strategies

- Johnson, D.W., & Johnson, F.P. (2000). *Joining together: Group theory and group skills* (7th ed.). Boston: Allyn & Bacon.
- Shinn, M.R., Walker, H.M., & Stoner, G. (Eds.). (2000). *Interventions for academic and behavior problems II: Preventive and remedial approaches*. Bethesda, MD: National Association of School Psychologists.

Web Resources

- Davenport, L.R. (1993). *The effects of homogeneous groupings in mathematics*. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education. (ERIC Document Reproduction Service No. ED359065). Available at www.ed.gov/databases/ERIC_Digests/ed359065.html
- Elbaum, B., Moody, S.W., Vaughn, S., Schumm, J.S., & Hughes, M. (2002). *The effect of instructional grouping format on the reading outcomes of students with disabilities: A meta-analytic review*. New York: National Center for Learning Disabilities. Available at http://www.nclld.org/research/osep_reading.cfm
- Johnson, D.T. (2000). *Teaching mathematics to gifted students in a mixed-ability classroom*.

Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education (ERIC Document Reproduction Service No. ED441302). Available at www.ed.gov/databases/ERIC_Digests/ed441302.html

North Central Regional Educational Laboratory (NCREL). Available at <http://www.ncrel.org/>

Vaughn, S., Hughes, M.T., Moody, S.W., & Elbaum, B. (2001). Instructional grouping for reading for students with LD: Implications for practice. *Intervention in School and Clinic*, 36(3), 131–137. Available at www.idonline.org/ld_indepth/reading/instructional_grouping.html

Peer Assisted Learning Strategies (PALS)

Fuchs, D., & Fuchs, L.S. (1998). Researchers and teachers working closely together to adapt instruction for diverse learners. *Learning Disability Research and Practice*, 13(3), 126–137.

Fuchs, L.S., Fuchs, D., & Karns, K. (2001). Enhancing kindergartners' mathematical development: Effects of peer-assisted learning strategies. *Elementary School Journal*, 101(5), 495–510.

Fuchs, D., Fuchs, L.S., Mathes, P.G., & Simmons, D.C. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal*, 34(1), 174–206.

Mathes, P.G., Howard, J.K., Allen, S.H., & Fuchs, D. (1998). Peer-assisted learning strategies for first-grade readers: Responding to the needs of diverse learners. *Reading Research Quarterly*, 33(1), 62–94.

Web Resources

PALS (Vanderbilt University) <http://kc.vanderbilt.edu/kennedy/pals>

Peer Assisted Learning Strategies in Reading
http://www.idonline.org/ld_indepth/reading/peer_assisted.html

Fuchs, D., & Fuchs, L.S. (2002). *Learning accommodations for individuals with special needs*. Nashville, TN: Vanderbilt University, John F. Kennedy Center for Research on Human Development. Available at http://www.vanderbilt.edu/kennedy/programs/lai_main.html.

Professional Collaboration

Carter, B. (2000). The use of team teaching as a means to integrate students with special needs into the general education classrooms. Huntsville: University of Alabama, Curriculum Development/ED606.

Coker, D.R. (1994). Collaboration in the classroom: Joint responsibilities of teachers for specified instruction. *Journal of Instructional Psychology*, 21(1) 3–7.

Flemming, J.L., & Monda-Amaya, L.E. (2001). Process variable critical for team effectiveness: A Delphi study of wraparound team members. *Remedial and Special Education*, 22(3), 158–171.

Friend, M., & Cook, L. (2000). *Interactions: Collaboration skills for school professionals* (3rd ed.). New York: Addison Wesley Longman.

Snell, M.E., & Janney, R. (2000). *Teacher's guide to inclusive practices: Collaborative teaching*. Baltimore: Paul H. Brookes.

Walther-Thomas, C., Korinek, L., McLaughlin, V.L., & Williams, B.T. (1999). *Collaboration for*

inclusive education: Developing successful programs. Boston: Pearson Allyn & Bacon.

Learning Strategies

Alley, G.R., & Deshler, D.D. (1979). *Teaching the learning disabled adolescent: Strategies and methods.* Denver, CO: Love.

Graham, S., Harris, K.R., & Reid, R. (1992). Developing self-regulated learners. *Focus on Exceptional Children*, 24, 1-16.

Reid, D.K., Hresko, W.P., & Swanson, H.L. (1996). *Cognitive approaches to learning disabilities* (3rd ed.). Austin, TX: Pro-Ed.

Web Resources

Boudah, D.J., & O'Neill, K.J. (1999). Learning strategies. Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Services No. ED433669) Available at <http://searcher.eric.org/digests/ed433669.html>

Muskingum College, Center for Advancement of Learning, (1998). *Bibliography of learning strategies resources.* New Concord, OH: Author. Available at <http://muskingum.edu/~cal/database/bibliography.html>

NICHCY. (1997a). *Interventions for students with learning disabilities* (News Digest 25). Washington, DC: National Dissemination Center for Children with Disabilities. Available at <http://www.nichcy.org/pubs/newsdig/nd25txt.htm>

NICHCY. (1997b). *Learning strategies for students with learning disabilities* (Resource List 14). Washington, DC: National Dissemination Center for Children with Disabilities. Available at <http://www.nichcy.org/pubs/bibliog/bib14txt.htm>

University of Kansas, Center for Research on Learning. Available at <http://www.ku-crl.org/publications/index.html>

Mnemonics

Forness, S.R., Kavale, K.A., Blum, I.M., & Lloyd, J.W. (1997). Mega-analysis of meta-analysis: What works in special education and related services. *Teaching Exceptional Children*, 29(6), 4–9.

Mastropieri, M.A., Sweda, J., & Scruggs, T.E. (2000). Teacher use of mnemonic strategy instruction. *Learning Disabilities Research and Practice*, 15, 69–74.

Swanson, H.L. (1999). *Interventions for students with learning disabilities: A meta-analysis of treatment outcomes.* New York: Guilford Press.

Uberti, H.Z., Scruggs, T.E., & Mastropieri, M.A. (2003). Keywords make the difference: Mnemonic instruction in inclusive classrooms. *Teaching Exceptional Children*, 10(3), 56–61.

Web Resources

The Access Center. (2003). Using mnemonics to facilitate access to the general education curriculum. Washington, DC: The Access Center. Available at http://www.k8accesscenter.org/training_resources/Mnemonics.asp

Current Practice Alerts: A focus on mnemonic instruction. Available at http://www.teachingld.org/ld_resources/alerts/5.htm

Tutorial on Mnemonics by Division of Learning Disabilities of CEC (Member's only section of website) Available at www.teachingld.org

Also see references for Learning Strategies section.

Adapted Books and Text

Beck, J. (2002). Emerging literacy through assistive technology. *Teaching Exceptional Children*, 35(2), 44–48.

Curry, C. (2003). Universal design: Accessibility for all learners. *Educational Leadership*,

Higgins, K., Boone, R., & Lovitt, T.C. (2002). Adapting challenging textbooks to improve content area learning. In M.A. Shinn, H.M. Walker, & G. Stoner, (Eds.), *Interventions for academic and behavioral problems II: Preventive and remedial approaches*, (pp.755–790), Bethesda, MD: National Association of School Psychologists.

Lewis, S., & Tolla, J. (2003) Creating and using tactile experience books for young children with visual impairments. *Teaching Exceptional Children* 35(3), 22–28.

Technology specialists in your district

Web Resources

CAST. Available at <http://www.cast.org/>

Products for Special Needs & Education. Mayer Johnson, Inc. Available at <http://www.mayerjohnson.com/>

Robinson, L. (2000). *Adapting literacy activities for young children*. Macomb, IL: Center for Best Practices in Early Childhood. Available at www.wiu.edu/users/mimacp/wiu/articles/adaptlit.html

Literacy Rich Environments

Higgins, K., Boone, R., & Lovitt, T.C. (2002). Adapting challenging textbooks to improve content area learning. In M.A. Shinn, H.M. Walker, & G. Stoner, (Eds.), *Interventions for academic and behavioral problems II: Preventive and Remedial Approaches*, (pp 755–790), Bethesda, MD: National Association of School Psychologists.

Katims, D., & Pierce, P. (1995). Literacy-rich environments and the transition of young children with special needs. *Topics in Early Childhood Special Education*, 15(2), 219–234.

Web Resources

Gunn, B.K., Simmons, D.C., & Kameenui, E.J. (1995). *Emergent literacy: A synthesis of the research*. Eugene, OR: National Center to Improve the Tools of Educators. Available at <http://idea.uoregon.edu:16080/~ncite/documents/techrep/tech19.html>

Snow, C.E., Burns, M.S., & Griffin, P. (1999) *Language and literacy environments in preschool*. Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education. Available at <http://ericece.org/pubs/digests/ed426818.html>

Whitehurst, G.J. (2003) *Classroom Literacy Environment Checklist*. New York: National Center for Learning Disabilities. Available at http://www.getreadytoread.org/pdfs/School_Environ_Scan.pdf

Curriculum-Based Measurement

- Deno, S.L., Fuchs, L.S., Marston, D., & Shinn, J. (2001). Using curriculum-based measurement to establish growth standards for students with learning disabilities. *School Psychology Review, 30*, 507-524.
- Fuchs, L.S., Fuchs, D., Karns, K., Hamlett, C.L., Dutka, S., & Katzaroff, M. (2000). The Good III, importance of providing background information on the structure and scoring of performance assessments. *Applied Measurement in Education, 13*(1), 83–121.
- R.H., & Kaminski, R.A. (1996). Assessment for instructional decisions: Toward a proactive/prevention model of decision-making for early literacy skills. *School Psychology Quarterly, (7)*, 326–336.
- Howell, K.W., & Nolet, V. (2000). *Curriculum-based evaluation: Teaching and decision making* (3rd ed.). Belmont, CA: Wadsworth Thomson Learning.
- Phillips, N.B., Fuchs, L.S., & Fuchs, D. (1994). Effects of classwide curriculum-based measurement and peer-tutoring: A collaborative researcher-practitioner interview study. *Journal of Learning Disabilities, 27*(7), 420–434.
- Shinn, M.R. (Ed.). (1989). *Curriculum-based measurement: Assessing special children*. New York: The Guilford Press.

Web Resources

- Roberts, M., Marshall, J., Nelson, R., & Albers, C. (2001) Curriculum-based assessment procedures embedded within functional behavioral assessments. *School Psychology Review, 30*, 264–277. Available at http://www.ldonline.org/ld_indepth/research_digest/fba.html
- Wright, J. (n.d.). *Curriculum-based measurement: A manual for teachers*. Syracuse, NY: Author. Available at <http://www.jimwrightonline.com/pdfdocs/cbaManual.pdf>

Functional Behavior Assessments

- Horner, R.H., & Carr, E.G. (1997). Behavioral support for students with severe disabilities: Functional assessment and comprehensive intervention. *Journal of Special Education, 31*(1), 84–109.
- Shippen, M.E., Simpson, R.G., & Crites, S.A. (2003). A practical guide to functional behavioral assessment. *Teaching Exceptional Children, 35*(5), 36–44.
- Snell, M. and Janney, R. (2000). *Behavioral supports (Teacher's guides to inclusive practices series)*. Baltimore: Paul H. Brookes.

Web Resources

- Miller, J.A. (2001). *Multimodal Functional Behavioral Assessment*. Bethesda, MD: National Association of School Psychologists. Available at http://www.naspcenter.org/teachers/idea_multimodal.html
- Miller, J.A., Tansy, M., & Hughes, T.L. (1998). Functional behavioral assessment: The link between problem behavior and effective intervention in schools. *Current Issues in Education, 1*(5). Available at <http://cie.ed.asu.edu/volume1/number5/>
- Office of Special Education Programs Technical Assistance Center on Positive Behavioral Interventions & Supports. Available at <http://www.pbis.org/>
- Office of Special Education Programs. (2000). *Twenty-second annual report to Congress*.

For additional information on this or other topics, please contact The Access Center at accesscenter@air.org.

The Access Center: Improving Outcomes for All Students K-8

The Access Center is a cooperative agreement (H326K020003) funded by the U.S. Department of Education, Office of Special Education Programs, awarded to the American Institutes for Research
1000 Thomas Jefferson St. NW, Washington, DC 20007
Ph: 202-403-5000 TTY: 877-334-3499 Fax: 202-403-5001
e-mail: accesscenter@air.org website: www.k8accesscenter.org



U.S. Office of Special Education Programs

This report was produced under U.S. Department of Education Grant # H326K020003 with the American Institutes for Research. Jane Hauser served as the project officer. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.



AMERICAN INSTITUTES FOR RESEARCH®