Adaptations
Are Essential:
Early Years Mathematics

A Resource Guide
For Adapting Learning and Assessment Tasks
For Students With Mild Disabilities

Adaptations Are Essential: Early Years Mathematics was developed by Dr. Mark Jewell, director of Curriculum, Instruction and Assessment, Federal Way Public Schools.

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For Students With Mild Disabilities

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Introduction

"Adaptations Are Essential" is a series of resource guides written for teachers and other service providers who work with students with mild disabilities. The guides describe strategies for aligning students' individualized education programs (IEPs) with the State of Washington's essential academic learning requirements (EALRs). Separate resource guides have been developed for mathematics, reading, and writing. Each guide includes the following components:

- General information about adapting instruction and assessment and why such adaptations are essential.
- A decision making model for adapting instruction and assessment.
- Suggestions for adapting assessments using materials from the Washington Assessment of Student Learning (WASL) and Washington Model for Classroom-Based Evidence (CBE).
- Research-validated teaching strategies for helping students achieve various EALRs.

"Adaptations Are Essential" was written in response to SSB 6062 passed by the Washington Legislature in 1998. The legislation requires that a portion of the federal special education funds the state receives be allocated to support projects designed to help teachers improve services provided in general education classrooms to students with disabilities.

"Adaptations Are Essential" has been reviewed and fieldtested by teachers throughout the state of Washington. Many of the state's educational service districts (ESDs) assisted with the review and fieldtest process. A listing of teachers and ESD personnel who participated in the initial review and pilot of the resource guides follows.

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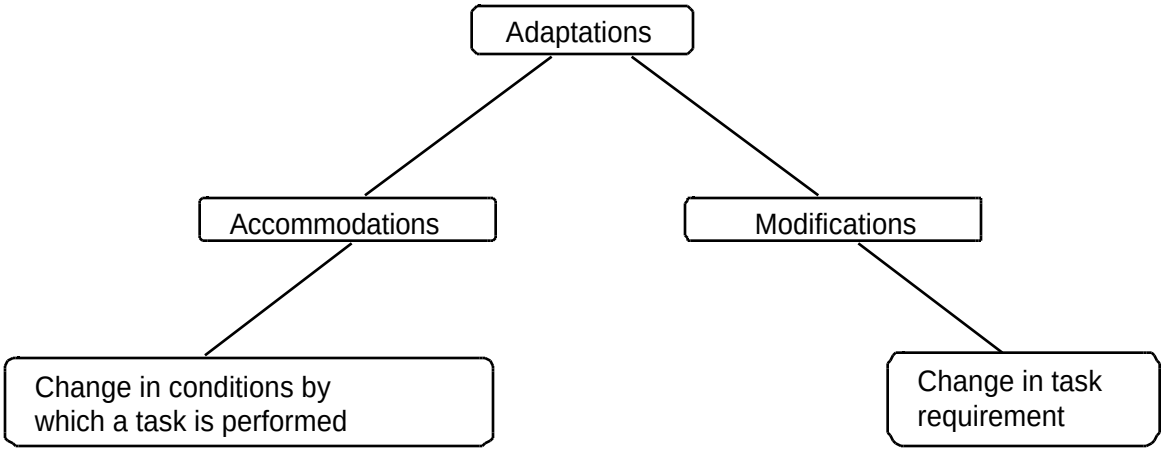
A special note of appreciation is also extended to Dr. Anita Archer who has given permission to reproduce “Guidelines for Adapting Materials for Students with Disabilities” in its entirety (pp. 63–64).

What Are Adaptations?

For the purpose of this resource guide, an adaptation is defined as any change made in the learning and assessment tasks of the general education program. While the general education program is designed to meet the needs and learning characteristics of typical learners, the program can be made more appropriate for students with disabilities by making changes in the learning environment, instructional materials and activities, teaching strategies, student performance requirements, and by providing alternate learning and assessment tasks.

This resource guide describes two types of adaptations: accommodations and modifications.



- An **accommodation** is an adaptation that results in the student with a disability accomplishing the same goals and objectives as the nondisabled student and ***does not fundamentally*** alter the general education program.

An accommodation ***changes the conditions*** by which a disabled student accomplishes the same task as the nondisabled student. Accommodations are used to minimize the impact of a disability and circumvent deficiencies in specific academic areas. Accommodating deficits in order to meet individual learning needs is a time-honored tradition in special education.

> ***Example:*** If a task of the third grade social studies program is to learn about the major groups of American Indians, an accommodation for a student with a learning disability might be to have the student read articles that are written at a lower readability level than what the rest of the class is assigned. The task remains the same for the student with a disability (i.e., learning about the major groups of American Indians), but the instructional materials have been adapted to meet that student's needs.

- A **modification** is an adaptation that results in the student with a disability accomplishing different goals and objectives as nondisabled students and fundamentally alters the general education program.

A modification ***alters the task*** in a way that the student is able to accomplish a different, but perhaps related, task than that assigned to the nondisabled peers. Modifications are used to remediate deficiencies in specific academic areas by bringing the goals and objectives of the curriculum in closer alignment with the student's present level of educational performance. Modifying the goals and objectives of general education is an important part of specially designed instruction.

> ***Example:*** If a task of the fourth grade reading program is for students to summarize nonfiction articles, a modification for a student with a disability might be to use vocabulary words from the assigned article to practice writing complete, meaningful sentences. The task has been changed for the student with a disability; however, the student is working with the same materials as the nondisabled classmates.

An adaptation should be based on the needs of individual students and evaluated to determine its effectiveness. One measure of the effectiveness of an adaptation is how well it increases a student's access to the learning opportunities of the general education program. A second measure of the effectiveness of an adaptation is how well it helps a student achieve the goals and objectives that have been established for the student. This resource guide is designed to help teachers design, implement, and evaluate adaptations that are identified on the basis of individual needs of students.

Why Are Adaptations Essential?

Adaptations are essential for sound educational reasons and compelling legal reasons. First, learning can be increased reliably and dramatically when teachers adapt academic tasks. In contrast, learning problems occur when there is a mismatch between a learner's ability and the tasks assigned to that student.

Second, while there is no legal requirement for adapting learning and assessment tasks for general education students, there are legal safeguards regarding adaptations for students with disabilities. The legal requirements for adaptations are specified in the Individuals with Disabilities Education Act, Section 504 of the Rehabilitation Act of 1973, and the Education Reform Act of 1993 (ESHB 1209).

Adaptation Requirements of the Individuals with Disabilities Education Act

On June 4, 1997, President William Clinton signed the reauthorized Individuals with Disabilities Education Act (IDEA). The 1997 reauthorization was the fourth time since 1975 that Congress approved amendments to the national law creating federally funded special education programs. The basic intent of the original legislation was to provide equal educational opportunity for students with disabilities. The reauthorization reaffirmed the federal government's commitment to a free appropriate public education for students with disabilities.

For general education teachers, the most important part of the legislation is probably the requirement that students with disabilities must be educated with their nondisabled peers "to the maximum extent possible." The law further states that removal of students with disabilities from general educational settings should only happen when students with disabilities cannot be successful there with supplementary aids and services. Supplementary aids and services are the adaptations needed for the special education student to benefit from the general education program.

In addition to the basic provisions of the original IDEA legislation, the new amendments require both classroom teachers and specialists to develop adaptations for special education students in the following areas:

Curriculum and instruction requirements. IDEA '97 requires that disabled students' work be linked to the general education curriculum.

Assessment requirements. IDEA '97 requires that all students with disabilities be included in state or district assessment programs or be given an alternate assessment.

IDEA '97 further requires states to set performance goals for students with disabilities that are consistent, to the maximum extent appropriate, with the goals and standards established by the state for other students. States must establish performance indicators that address disabled students' performance on assessments and dropout and graduation rates and that public reports be provided on progress toward those goals. Each state is required to issue a progress report on its disabled students and report on their participation in assessments to federal officials every two years.

Adaptation Requirements of the Rehabilitation Act of 1973

By definition, special education students have disabilities that result in significant problems with learning and behavior that interfere with their progress in school. While not all students with disabilities are eligible for federally funded special education programming, all students with disabilities must be ensured equal educational opportunity. This legal safeguard was conferred by the Rehabilitation Act (P.L. 93-112). Passed by Congress in 1973, this was the first federal civil rights law to specifically protect the rights of children and adults with disabilities. The law was passed in an attempt to end education and job discrimination on the basis of a person's disability. Section 504 of the Rehabilitation Act prohibits discrimination of students with disabilities and requires that schools provide them with equal opportunity, which includes a legal right to access to the general education program, extracurricular activities in their local schools, and instructional and curriculum adaptations. Adaptations are necessary for most students with a disability and Section 504 ensures that students with disabilities have access to accommodations for the purpose of ensuring equal opportunity.

Assessment Requirements of the Education Reform Act of 1993

Since the passage of its Education Reform Act of 1993, the state of Washington has been engaged in a sustained effort to improve the quality of schooling. Washington has specified content standards for major subject areas and a new assessment system is under development to measure pupil progress toward achieving the new high standards.

Results achieved by fourth grade special education students on the 1997, 1998, 1999, and 2000 WASL appear in the table below.

Grade 4 Special Education Students Meeting Standard on the WASL

	1997 (n = 5,698)	1998 (n = 7,552)	1999 (n = 8,677)	2000 (n = 7,737)
Listening	29 percent	45.8 percent	44.8 percent	40.1 percent
Reading	6.7 percent	13.6 percent	19.7 percent	27.2 percent
Writing	7.7 percent	7.8 percent	7.7 percent	10.3 percent
Mathematics	2.2 percent	7.9 percent	11.5 percent	14.5 percent

Public schools in the state of Washington serve approximately 111,000 special education students. Given the high-stakes nature of the new assessments, teachers have a powerful incentive for ensuring that special education students attain the new standards. Increasing the numbers of special education students as well as general education students who successfully complete state-level assessments in Washington will require that teachers acquire and use more effective teaching strategies.

Summary

Adaptations are essential for both students with disabilities as well as other youngsters with low achievement not placed in a special education program. All special education students are legally entitled to an individualized education program that includes not only access to the general education program but also special education and related services. Meeting the academic, emotional, and physical needs of students with disabilities requires adapting the general education program. For some students with disabilities, the instruction received in the regular classroom will suffice with minor adjustments or accommodations. However, for those students experiencing significant behavioral, motivational, or academic difficulties, the instructional program may need to be altered more substantially using modifications. It is important to note, however, that adaptations do not guarantee equal results for persons with or without disabilities. Such adaptations only afford equal opportunity to achieve equal results.

How Do You Adapt Learning and Assessment Tasks?

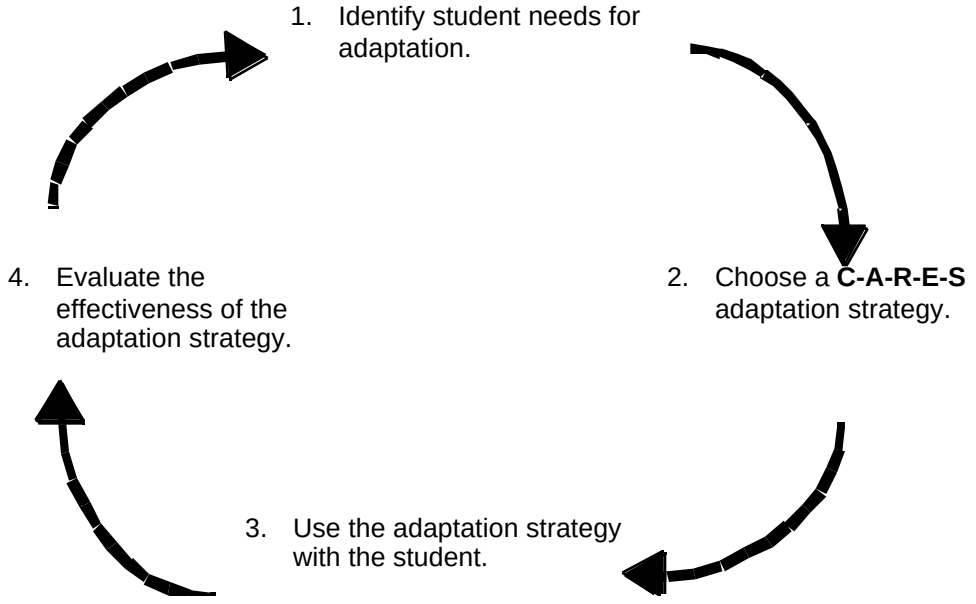
Special education students may not need adaptations (e.g., supplementary aids and program modifications) in every area of the general education program. However, schools must ensure that students be given special assistance in areas of identified need. Knowledge of a student's special education label gives very limited information about how best to teach that child. Consequently, teachers must consider what adaptations are appropriate for students on a case-by-case basis.

This section describes a decision making model for considering what areas of a student's instructional program should be adapted. The model takes into account what is taught, how it is taught, and how it is assessed. The model uses an acronym that will help teachers remember the steps of the strategy. The acronym is **I-C-U-E,** and it is a play on words. Pronounced like "I.Q.," the acronym uses the word "I" and "cue" to help teachers use a smart way to adapt learning and assessment tasks.

The I-C-U-E Process for Adapting Instruction and Assessment

One component of this resource guide is a decision making process for adapting the general education curriculum. The process represents a systematic approach to adapting instruction and assessment for special education students as well as other students with special needs. The **I-C-U-E** process for adapting instruction and assessment includes four steps:

1. **Identify student needs for adaptation.**
2. **Choose a C-A-R-E-S adaptation strategy** (see pp. 13–19).
3. **Use the adaptation strategy with the student.**
4. **Evaluate the effectiveness of the adaptation strategy.**



I Identify student needs for adaptations. To identify a student's needs for adaptations, the teacher must consider the skills, abilities, and behaviors demonstrated by the child. An understanding of the major cognitive, academic, psycho-motor, and social-emotional characteristics provide a starting point for anticipating what kind of adaptations the student may need.

1. **Review student's evaluation report and individualized education program (IEP) for recommendations about adaptation.** According to federal and state statutes, teachers should receive information from the evaluation report that addresses "how the students' disability affects the involvement and progress in the general curriculum" (WAC 392-172-10905).

   In addition, the student's IEP must include a statement of "the specific accommodations, modifications, and supports that must be provided to the student" (WAC 392-172-158). Teachers should be able to use this information as a starting point for deciding how to adapt assessment and instruction for special education students.

2. **Determine the requirements for successful performance in the general education program.** After considering the information in a student's evaluation and IEP, teachers need to analyze the general education curriculum (i.e., the curriculum provided nondisabled students) to clarify specifically what students must know and be able to do in order to perform satisfactorily in the instructional program. By carefully analyzing students' learning needs and specific demands of the assessment and learning tasks, teachers can provide reasonable adaptations in the general education program for most special education students.

Two important questions should be asked to determine the requirements for successful performance in the general education program:

- What are the specific tasks that the student must master to succeed in this classroom?

- What is the sequence in which these tasks will be presented?

Teachers may want to create a list of what the setting demands are of the general education program. A setting demand is simply a requirement of a specific environment. It is useful to list what knowledge and skills the student is expected to have already in place in order to master current course content. An example of a setting demands inventory appears on the next page.

3. **Identify factors hindering student performance on the assessment or learning tasks of the general education curriculum.** Teachers need to consider what factors may hinder a student's ability to complete the academic tasks of the general education program. Pugach and Wesson (1990, p. 90) recommended considering the following ten questions:

   1. What do we wish the student would do that he or she is not doing?
   2. What is the student doing that we wish he or she was not doing?
   3. When does the behavior occur? Does it happen at a certain time of the day?
   4. Does the student have the problem during activities, independent activities, or small-group activities?
   5. Does the problem occur during a particular academic topic or across different topics?

6. Do other children also have this problem? If so, who and how many children? Is there something that needs to be changed for the whole class?
7. Does the student know that the problem exists, or is he oblivious to the problem? Has the student been directly informed to change his or her behavior?
8. Is the problem related to school behaviors (attention, work completion), social behaviors (peer relationships, self-concept), or academic behaviors (learning new concepts, remembering to apply strategies)?
9. Is it a problem that can be ignored because addressing it may create more of a disruption than the problem itself?
10. Should we discuss the problem with another teacher so that we can get someone else's perspective on it and because talking about it may help us understand the problem more fully?

Setting Demands Inventory

I expect my students to:	**I have taught and/or modeled the skill:**	
___ read grade-level instructional materials independently	__ yes	__ no
___ preview what is read	__ yes	__ no
___ identify main ideas	__ yes	__ no
___ support generalizations	__ yes	__ no
___ take notes from reading assignments	__ yes	__ no
___ write in response to what they read	__ yes	__ no
___ answer multiple-choice questions	__ yes	__ no
___ answer short-answer questions	__ yes	__ no
___ answer extended-response questions	__ yes	__ no
___ increase their reading vocabulary	__ yes	__ no
___ use context clues	__ yes	__ no
___ use the dictionary	__ yes	__ no
___ manage their time	__ yes	__ no
___ participate in class discussions	__ yes	__ no
___ write a well-developed paragraph	__ yes	__ no

C **Choose a C-A-R-E-S adaptation strategy.** After identifying student needs for adaptations, a teacher must decide which level of intervention may be needed to help a student perform the teaching or assessment task. This resource guide presents a five-level approach to adaptation called **C-A-R-E-S.**

Level 1 represents adaptations that change the learning environment.
Level 2 represents adaptations that alter materials and activities.
Level 3 represents adaptations that revise teaching strategies.
Level 4 represents adaptations that exchange task requirements.
Level 5 substitutes an alternate learning or assessment task.

The first three levels represent accommodations because they do not fundamentally alter the general education program's goals and objectives. The last two levels represent modifications because they fundamentally alter goals and objectives of the general education program.

A complete description of the **C-A-R-E-S** approach is described on pp. 13–19 of this guide.

U **Use adaptation strategies.** Adaptations may require substantial preplanning by teachers. It is a good idea to develop a formal plan for using adaptations, especially if the teacher has not used the adaptation in the past. A plan might include the following components:

1. Develop a description of what complete implementation of the strategy will look like.

2. Make a timeline of when the adaptation will be tried out.

3. Assess obstacles that might prevent you from implementing the adaptation and try to determine a course of action to overcome each obstacle.

4. Implement the change strategies.

E **Evaluate the effectiveness of the adaptations.** Adaptations should facilitate learning. To determine whether adaptations are effective, teachers need to develop a plan that identifies (1) the data collection procedures and (2) the frequency of assessment.

Data collection procedures. Teachers have many choices in selecting evaluation activities. Teachers must distinguish between ***skill-span assessment*** and ***specific skill assessment***. ***Skill-span assessment*** is used for surveying a variety of skills. ***Specific skill assessment*** is continuous and occurs throughout the year. While administered only at Grades 4, 7 and 10, the Washington Assessment of Student Learning (WASL) is an example of a skill-span assessment. Individual activities found in the classroom-based evidence models (CBEs) are examples of specific skill assessment.

Assessment frequency. The frequency with which assessment occurs should be specially designed to account for the strengths and weaknesses of individual students. Some students may benefit from more frequent assessment. Kerr and Nelson (1989) developed the following recommendations for adjusting the frequency of assessment:

- Use session-by-session (one or more daily) recording when student progress is rapid through a small-step sequence.
- Use daily recording when student behavior fluctuates and daily program adjustments are needed.
- Use daily recording when the daily progress of the student is needed for intervention modifications.
- Use biweekly probes or weekly probes when student progress is slow.
- Use biweekly or weekly probes when general monitoring of progress is needed and frequent adjustments are not needed.
- Use biweekly, weekly, or monthly probes when evaluating maintenance or generalization of previously mastered skills.

Using the C-A-R-E-S Approach to Adaptation

The approach to adaptations described in this resource guide is based on the ***principle of least assistance*** (Adelman and Taylor, 1993). According to this principle, adaptations are ordered from least to most support. Teachers start with one type of minimal support and increase it only as they see that the child requires it. This approach to adaptation is sometimes called trial teaching, dynamic assessment, or diagnostic teaching.

Using adaptations helps a teacher to identify the task on which the student should be instructed. In this sense, adaptations are really hypotheses about the minimal instructional adjustments needed for the child to succeed in materials at or near his or her grade placement. The level of support provided can always be increased, but if we start with high levels of support it may not be clear whether the student could perform just as well with less assistance.

Accommodations
(adapted task conditions)

1. **Change** the learning environment in which the task is to be performed.
2. **Alter** instructional materials and activities used by student to complete the task.
3. **Revise** teaching strategies for presenting the task to the student.

Modifications
(adapted task requirements)

4. **Exchange** task requirements that define successful performance.
5. **Substitute** an alternate task that more clearly matches a student's present levels of performance.

Accommodations

(adapted task conditions)

C Change the learning environment in which the task is to be performed. Sometimes the student with a disability can participate successfully in general education if the learning or assessment environment is adapted. According to Kaplan and Drainville (1991), the learning environment includes all of the following components:

1. Physical arrangement, size, and comfort of the furniture and equipment.
2. Sensory climate: temperature, ventilation, lighting, colors, and odors.
3. Traffic flow and amount of physical activity.
4. Schedule and time of day.
5. Social climate, including the teacher and peers.
6. Daily curriculum and related school activities.
7. Physical and emotional health of the student, teacher, and peers.
8. Teaching style and expectations of the teacher.
9. Learning styles and self-esteem of students.

Accommodations can be as simple as changing the student's desk location closer to the teacher. A more complex accommodation may involve the teacher determining whether the learning task will be completed in the context of full-group, small-group, or individualized instruction.

This adaptation strategy maintains the student in the general education classroom. However, the regular classroom may or may not be suited to accomplishing the general education program for the student with a disability. Federal and state rules and regulations require that a full continuum of placement options be made available for students with disabilities.

A Alter instructional materials and activities used by the student to complete the task. Students spend a large portion of the day interacting with printed materials. Some printed materials and activities may be poorly written or not appropriate for the reading level of an individual student or group of students. Teachers should analyze the quality of printed materials and activities prior to presenting to students. A copy of guidelines for evaluating printed materials and activities developed by Dr. Anita Archer can be in found on pp. 63–64.

Determining the appropriateness of materials and activities. Teachers can use a student's sight vocabulary, oral reading rate and accuracy, and ability to answer comprehension questions to determine whether the instructional materials are at an appropriate level of difficulty. The independent level refers to materials that are easy to read for the student; the instructional level refers to those materials that are difficult enough to require assistance; the frustration level refers to those materials that are too difficult for students to read. For example, a student at any grade level is considered to be reading at an independent level if the student is (1) able to recognize more than 90 percent of sight vocabulary in the passage, (2) read correctly from the passage more than 120 words per minute, (3) have fewer than six words read incorrectly in the minute of reading, and (4) is able to answer correctly more than 90 percent of the comprehension questions that appear at the end of a passage.

Placement Guidelines for Reading Materials

Skill Area	Measurement Mode	Independent	Instructional	Frustration
Sight Vocabulary	Percent correct	>90	80–90	<80
Rate	correct words/min.	>120	70–119	<70
Accuracy	error words/min.	<6	6–10	>10

Comprehension	percent correct	>90	75–90	3<75

Materials and activities can be adapted by (1) clarifying the directions for completing the task and (2) scaffolding the tasks.

1. Clarify task directions. If the directions contain several steps, they can be simplified by presenting only one portion at a time and by writing each portion on the chalkboard as well as stating it orally. When using written directions, be sure that students are able to read and understand the words as well as comprehend the meaning of the sentences. While all of the following are appropriate accommodations for learning tasks, the last two strategies may not be permitted for assessment tasks.

- Give directions both orally and in writing.
- Restate oral directions in simpler language.
- Give only one or two oral directions at a time.
- Be sure students are able to see directions written on the chalkboard.
- Keep written directions on the student's reading level.
- Explain any new or unfamiliar terms.

2. Scaffold the learning task. Scaffolding refers to the guidance an adult or peer provides through verbal communication as a way of doing for the student what the student cannot do without assistance (Cazden, 1988). Teachers can add features to learning or assessment tasks that are particularly helpful for students who have difficulty focusing on relevant instructional cues. Sometimes referred to as procedural facilitators, these features scaffold, or structure, the task and help the student know exactly what to do.

Procedural facilitators fall loosely on a hierarchy from the least amount of assistance to the greatest amount of assistance. For example, when a student makes an error, the teacher might begin prompting at the "top" of the hierarchy, cueing the student to respond. If the cue fails to produce a correct answer, the teacher might then move down the hierarchy, systematically giving increasing levels of assistance.

Scaffolding Levels

Level	Description	Example
Cue	Ask again; student may not have attended to the question.	"Read the word."
Visual	Highlight correct response in some way.	F<u>ee</u>t (teacher underlines the double-vowel pattern).
Verbal	Partially supply or describe the answer.	"The ***smallest*** coin." "Line up the ones column."
Model	Show or tell the correct answer.	"The word is 'rope.' What's the word?"
Manual	Give physical assistance.	Place hand over the child's to write her or his name.

Revise teaching strategies for presenting the task to the student. If students are not succeeding with a task after changes have been made in the learning environment and materials have been altered, teachers should consider revising their teaching strategies. Current teaching strategies may lack clarity, fail to provide adequate guided practice, or do not include sufficient examples. Deborah Simmons, Doug Fuchs, and Lynn Fuchs (1991) developed an instructional template to help teachers include explicit teaching steps within their lessons. This template reminds teachers of steps to use before, during, and after instruction for explicit teaching.

Instructional Template for Explicit Teaching Procedures
(Simmons, Fuchs, and Fuchs, 1991)

Before Instruction

- Note time allocated for instruction (total instructional time and estimated time for teacher-directed instruction).
- Determine lesson objective (the student will be able to . . .).
- List preskills to review ("Before we begin, let's review . . . ").

During Instruction

- Frame lesson ("Today we're going to learn . . . " "This is important because . . . ").
- Present target skill ("Listen and watch as I show you . . . ").
- Guide practice ("Let's try this one together.").
- Correct errors and provide feedback (correct response—"That's right"; hesitant response—"Good" and repeat the rule or procedure; and incorrect response—use prompts on process errors and model correct response on factual errors).
- Prepare for independent practice ("Let's do the first one together.").

After Instruction

- Monitor independent practice (circulate throughout the room and provide feedback to students through brief interactions).
- Review new skills (review skills at the end of the lesson and systematically throughout the instructional year).

Simmons, D.C., Fuchs, D., and Fuchs, L.S. (1991). Instructional and curricular requisites of mainstreamed students with learning disabilities. ***Journal of Learning Disabilities, 24,*** 354–360.

Teachers are often inclined to revise teaching strategies before having tried to change the learning environment or alter instructional materials. Revising teacher strategies often requires significant change in teaching behavior. This effort may not be warranted if students are successful with the first two levels of **C-A-R-E-S** adaptations.

Assuming that the initial instruction included the characteristics described by Simmons, Fuchs, and Fuchs, and a student is unable to perform a learning or assessment task, the teacher may want to consider the following strategies:

1. Provide additional presentation of target skills and information. Students may not have acquired a skill or information previously presented by a teacher for a variety of reasons. For example, a student may have been absent or attending a different school when a teacher originally presented a lesson. Teachers must be willing to provide repeat instruction on target skills in such cases.

2. Increase practice opportunities. Students require different amounts of practice to master skills or content. When a skill is newly introduced, students should have brief massed practice sessions on that skill. In subsequent lessons, the student should practice the objective at more interspersed intervals.

3. Increase motivation for successful performance of task. Given that not all academic tasks are reinforcing for every student, teachers must be able to identify methods to effectively motivate students to succeed in performing learning tasks. Below is a list of some intrinsic and extrinsic reinforcers. Teachers can use this hierarchy of potential reinforcers to find alternative ways to increase motivation for completing the task.

Hierarchy of Potential Reinforcers With Classroom Examples

Reinforcers	Classroom Examples
Intrinsic reinforcers	challenge of learning, sense of accomplishment
Knowledge of results	feedback on accuracy, confirmation, number or percentage correct
Social reinforcers	attention, praise, approval, calls and notes to parents
Activity reinforcers	special privileges, duties, free time, games
Token reinforcers	letter grades, points, check marks, stars, signatures which can later be exchanged for other reinforcers
Concrete reinforcers	toys, prizes, school supplies, awards
Primary reinforcers	food, candy, treats

The timing of consequences is also important. Collecting all the work at the end of the day only to discover that some of the children made errors on more than 50 percent of the items does not result in efficient learning. Teachers can, for example, permit students to finish one row of problems, then self-check by comparing their answers to those provided by the teacher.

Modifications

(adapted task requirements)

E Exchange task requirements that define successful performance. Modifying the requirements that define successful performance of a task is the fourth alternative to consider when adapting instruction. A task can be modified along several dimensions of performance criteria and conditions under which the task is completed. The exchange task requirements form on the next page can be used for considering what dimensions of a learning task may be adapted by exchanging task requirements. The form contains components of clearly specified task requirements, including those components required by federal law to be included in a short-term objective of an individualized education program (IEP).

Task conditions refer to the circumstances under which the student must perform a task. The condition may specify which materials may be used to do the task, how the task may be accomplished (e.g., from memory, from the textbook, etc.), and the location of the performance.

- ***Change presentation mode.*** Read the items aloud to the student rather than expect the student to read the items independently.

Task characteristics specify what the student must perform, do, or produce that is used to evaluate the achievement of the task.

- ***Change response mode***. For students who have difficulty with fine motor responses (such as handwriting), the response mode can be changed to underlining, selecting from multiple choices, sorting, or marking. Students with fine motor problems can be given extra space for writing answers on practice sheets or can be allowed to respond on individual chalkboards.

Criteria for successful performance refer to the standard toward which the student can strive. If students are not achieving acceptable performance levels, teachers may need to change the criteria of acceptable performance. Performance criteria can be changed by adjusting requirements for quantity, rate, accuracy, frequency, and/or duration.

- ***Change quantity***. The number of problems, questions, or tasks can be reduced or increased.

- ***Change rate***. If rate is a relevant aspect of performance, time limits for completing tasks can be extended or shortened.

- ***Change accuracy expectation.*** A lower or higher rate of accuracy can be established.

- ***Change frequency expectation***. The number of times a task is to be performed can be reduced or increased.

- ***Change duration expectation***. Expectations for how long a task should be performed can be reduced or increased.

Evaluation procedures refer to the methods by which the teacher will use to collect data to determine whether a student can accomplish the task.

Schedule refers to how frequently the teacher will collect data to determine whether a student can accomplish the task.

Exchange Task Requirements Form

Original Task: Given a series of numbers, the student will describe two different patterns showing complete understanding of the task as measured by on-demand achievement test at the end of fourth grade.

	Original Task	Adapted Task
Task Conditions	Given a series of numbers.	
Task Characteristics	The student will describe two different patterns.	
Criteria for Successful Performance	Showing complete understanding of the task.	
Evaluation Procedures	As measured by on-demand achievement test.	
Schedule	At the end of fourth grade.	

S Select an alternate task that more closely matches student's present levels of performance. Selecting an alternate learning or assessment task represents the most extreme form of adaptation. An alternate task might be either a prerequisite task or a task not directly related to the original target task.

Bloom's Taxonomy of Educational Objectives (1956, p. 65) can be used for planning alternate tasks. Given a student's present levels of educational performance, you may want to consider tasks at a lower level of cognitive complexity to ensure students have the prerequisite skills. For example, comprehending an idea or concept is essential to applying it, analyzing, or using it creatively or evaluatively. Teachers should assess whether students understand an idea before asking them to use it.

Because Bloom's Taxonomy is organized from simple to complex, some educators interpret it as a ranking from trivial (knowledge) to important (synthesis, evaluation). However, this is not the intent of taxonomy. Different levels of tasks are appropriate for different purposes and for students at different stages of development. If a student fails to perform at one of the higher levels of the taxonomy, teachers should determine if prerequisite knowledge and skills at the lower levels is a problem.

The I-C-U-E Adaptation Planner for Mathematics

Accommodations (adapted task conditions)	
Change the learning environment.	· Have students complete assignments in pairs or in cooperative groups.
Alter instructional materials and activities.	· Reduce the number of problems on worksheet. · Provide adequate space to write out solutions. · Fold worksheets so students work on one line at a time.
Clarify directions.	· Color-code directions steps. · Provide charts showing a correct model for performing a strategy.
Scaffold the learning task.	· Allow students to use manipulatives or pictures. · Provide positive feedback about progress. · Provide mnemonics for operations and problem solving strategies. · Remind students of self-monitoring strategies. · Have students develop and maintain a math dictionary. · Use drawings and diagrams to illustrate new concepts and interrelationships. · Use number lines, fact sheets. · Use graph paper for students to align calculations.
Revise teaching strategies.	
Provide additional presentations.	· Teach self-instruction, self-monitoring, self-questioning, and self-reinforcement.
Increase practice opportunities.	· Use a variety of activities to promote mastery and automaticity (e.g., flashcards, computers, games, etc.).
Increase motivation.	· Use self-correcting materials. · Offer prompt feedback. · Personalize word problems to students' interests and real-life surroundings.
Modifications (adapted task requirements)	
Exchange task requirements.	
Change conditions.	· Allow students to use calculators in problem solving.
Change presentation mode.	· Present problems orally. · Paraphrase word problems.
Change response mode.	· Have students draw pictures and explain their solutions orally.
Change quantity criteria.	· Reduce number of items on assignments.
Change rate criteria.	· Assign students to work only even- or odd-numbered problems.
Change accuracy criteria.	· Give partial credit for partially correct responses.
Select an alternate task.	
Substitute an alternate task that more closely matches student's present levels of performance.	
Substitute a similar but easier task.	· Match instruction to students' error types. · Reduce sentence length and vocabulary complexity. · Eliminate extraneous information.
Substitute a prerequisite task.	
Substitute an important task not necessarily related to the target task.	

Adapting Assessment Tasks for Mathematics

Just as learning tasks should be adapted in light of the unique needs of students, so should assessment tasks. The annual IEP conference should include a consideration of assessment adaptations. The 1997 reauthorization of the Individuals with Disabilities Education Act (IDEA) requires special education students either to participate in state and district assessments or participate in an alternate assessment. The decision to exempt a special education student from such assessments must be made during the IEP meeting.

Students with disabilities frequently have difficulty displaying their knowledge or skills on assessments. In some cases, tests can be adapted in ways that can help teachers assess students with disabilities fairly and with a reasonable amount of accuracy. Adaptations for assessments are usually accommodations. That is, they represent changes in the conditions (e.g., environment or process) under which the assessment is administered.

It is important to note that not all adaptations are appropriate for criterion- or norm-referenced assessments. There is less flexibility for adapting norm-referenced achievement tests like the Iowa Tests of Basic Skills. The importance of following the instructions in the directions for administration cannot be overemphasized. Unless the test is administered according to the standard directions, the test results will contain an indeterminate amount of error and thereby prevent proper interpretation.

Teachers have far more flexibility in adapting the classroom assessments they design themselves or other informal assessments they obtain from other sources. Teachers can use the **I-C-U-E** process and the **C-A-R-E-S** approach to make sure that classroom-based assessment results reflect special education students' knowledge and skills, not their disabilities. Many of these adaptations will also benefit students who do not have disabilities.

A chart showing some adaptations organized according to the **C-A-R-E-S** approach is on the following page.

Examples of Adapted Assessment Tasks

Accommodations (adapted task conditions)	
Change the assessment environment.	· Determine whether assessment will be administered in full-group, small-group, or individualized basis. · Ensure physical accessibility. · Allow for isolation during assessment.
Alter assessment materials and activities.	· Enlarge type size. · Mask extraneous content.
Clarify directions.	· Record assessment directions. · Underline key words in directions. · Give samples at start of task.
Scaffold assessment task.	· Record assessment items. · Use capital letters for matching or multiple choice. · Underline key words in assessment items. · Provide manipulatives.
Revise assessment procedures.	
Provide additional assessments.	· Allow for reassessment.
Increase practice opportunities.	· Provide audio tapes of lectures. · Provide notes from lectures. · Familiarize students with assessment format.
Increase motivation.	· Provide options for completing task. · Provide feedback. · Pair task with positive consequences. · Assign grade based on amount of improvement over prior assessment grade.
Modifications (adapted task requirements)	
Exchange task requirements.	
Change conditions.	· Allow use of dictionary. · Allow use of calculator or other math manipulatives.
Change presentation mode.	· Present content in different medium (e.g., film, book, video, etc.). · Allow use of video instead of reading. · Give assessment in Braille. · Give assessment orally.
Change response mode.	· Oral report instead of essay. · Allow for dictation of responses. · Allow the student to use pocket charts or study cards for the assessment. · Allow student to demonstrate or dramatize.
Change quantity criteria.	· Assign small sections of the task. · Use shortened assessment which contains same concepts.
Change rate criteria.	· Give students additional time on assignments. · Provide additional time if power assessment.
Change accuracy criteria.	· Adjust cut score for passing. · Grade only relevant concepts.
Select an alternate task.	· Assess student from a different domain.

The Washington State Assessment System

The Office of Superintendent of Public Instruction administers a comprehensive assessment system in accordance with state law. Three key components are norm-referenced tests (e.g., the Iowa Tests of Basic Skills [ITBS] and the Iowa Tests of Educational Development [ITED]), the Washington Assessment of Student Learning (WASL), and assessment resources such as the Washington Model for Classroom-Based Evidence (CBE) found in the assessment toolkits developed originally by the Commission on Student Learning.

Both the WASL and the CBEs are designed to provide information about how well students have acquired the knowledge and skills needed to meet specific components of the essential academic learning requirements. The table below shows which EALRs in mathematics are assessed in the WASL and CBEs. Since not every EALR is tested by either the WASL or and CBEs, teachers will need to create their own assessments to determine whether their students have achieved EALRS not included in the WASL or CBE.

Assessment Component	Grade Level	Mathematics EALRs Assessed
Washington Assessment of Student Learning		
· Early Years	4	1.1, 1.2, 1.3, 1.4, 1.5, 2.2, 2.3, 3.1, 3.2, 4.1, 4.2, 4.3, 5.1, 5.2
Washington Model for Classroom-Based Evidence		
· "Preparing to Solve Math Problems"	3/4	1.1, 1.2, 1.3, 1.4, 1.5, 2.0, 3.0
· "Communicating through Mathematics"	3/4	1.1, 1.2, 1.3, 1.4, 1.5, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3

The table on the next two pages shows the relationship between the EALR components and how they are assessed on the WASL and the Washington Model for Classroom-Based Evidence.

The abbreviation or term SM in the table refers to student masters.

How the Essential Academic Learning Requirements in Mathematics Are Assessed in the Benchmark 1 WASL and CBEs

Essential Academic Learning Requirement	Grade 4 WASL Example Test Item	"Preparing to Solve Math Problems" CBE	"Communicating throug Mathematics" CBE
1.1 understand and apply concepts and procedures from number sense (number and numeration, computation, and estimation)	2, 18, 24, 25, 33, 35	SM 18, SM 21, SM 22, SM 23	SM 13c–d, SM 14a–c, SM 22a–b
1.2 understand and apply concepts and procedures from measurement	12, 16, 19, 32, 37	SM 14	SM 13a–d, SM 25a–e
1.3 understand and apply concepts and procedures from geometric sense (shape and dimension, relationships and transformations)	1, 8, 20, 27, 39	SM 17, SM 19, SM 29	SM 21a–d
1.4 understand and apply concepts and procedures from probability and statistics (probability, statistics, and prediction and inference)	9, 13, 22, 29	SM 24, SM 25	SM 17a–e, SM 18a–c, SM 26a–c
1.5 understand and apply concepts and procedures from algebraic sense (relations and representations, and operations)	3, 4, 11, 23, 31	SM 16, SM 18, SM 20	SM 19, SM 24a–c
2.1 investigate situations		SM 1–14, SM 15–29	
2.2 formulate questions and define the problem	7	SM 1–14, SM 15–29	
2.3 construct solutions (by choosing the necessary information and using the appropriate mathematical tools)	5, 28, 34	SM 1–14, SM 15–29	
3.1 analyze information (from a variety of sources; use models, known facts, patterns, and relationships to validate thinking)	14, 17, 40		
3.2 predict results and make inferences (and make conjectures based on analysis of problem situations)	6, 30		
3.3 draw conclusions and verify results (support mathematical arguments, justify results, and check for reasonableness of solutions)			
4.1 gather information (read, listen, and observe to access and extract mathematical information)	10		SM 13a–c, SM 14a–c, SM 15a–b, SM 23a–c, SM 24a–c, SM 25a–e, SM 26a–c
4.2 organize and interpret information	36		SM 16a–b, SM 17a–e, SM 23a–c, SM 24a–c, SM 25a–e, SM 26a–c

4.3 represent and share information (share, explain, and defend mathematical ideas using terms, language, charts, and graphs that can be clearly understood by a variety of audiences)	26, 36		SM 18a–c, SM 19, SM 20a–c, SM 21a–d, SM 22a–b, SM 23a–c, SM 24 a–c, SM 25a–e, SM 26a–c
5.1 relate concepts and procedures within mathematics (recognize relationships among mathematical ideas and topics)	15, 38		SM 20a–c
5.2 relate mathematical concepts and procedures to other disciplines (identify and apply mathematical thinking and notation in other subject areas)			SM 15a–b
5.3 relate mathematical concepts and procedures to real-life situations (understand the connections between mathematics and problem-solving skills used every day at work and at home)	21		SM 16a–b, SM 23a–c

How Mathematics Is Assessed on the WASL

The purpose of the Washington Assessment of Student Learning is to measure students' level of proficiency in selected essential academic learning requirements.

The mathematics section of the WASL assesses skills and reports achievement in five content strands (number sense, measurement, geometric sense, probability and statistics, and algebraic sense) and four process strands (solving problems, reasoning logically, communicating understanding, and making connections). The nine strands with 29 targets are presented on pp. 26–27.

How the Mathematics Section of the WASL Links to Washington's Essential Academic Learning Requirements

Strand 1
Number Sense

1. Identify and illustrate whole numbers and fractions in a variety of forms and representations, using pictures, models, and symbols (EALR 1.1.1).
2. Demonstrate an understanding of place value and magnitude in identifying, ordering, and comparing whole numbers and common or simple fractions (EALRs 1.1.1, 1.1.2).
3. Add, subtract, multiply, and divide whole numbers; demonstrate an understanding of whole number operations and fraction operations at the concrete level (EALRs 1.1.3, 1.14).

Strand 2
Measurement

1. Determine appropriateness of estimation and use estimation to predict computation results and determine reasonableness of answers (EALRs 1.1.6, 1.1.7).
2. Identify and illustrate properties of whole numbers and break (decompose), combine, compare, pattern/sequence, and order numbers (EALRs 1.1.1, 1.1.2).
3. Describe and compare objects and measurable attributes of objects (such as length, perimeter, area, volume or capacity, angle, weight, money, and temperature) in standard units (EALR 1.2.2).
4. Select, use and evaluate appropriate instruments, units (standard or nonstandard) and procedures for measuring time, money, length, area, volume, weight, and temperature (EALRs 1.2.6, 1.2.7).

Strand 3
Geometric Sense

1. Identify, describe, sort, and compare geometric figures using their attributes; describe how geometric shapes and objects in the surrounding environment are related; and construct geometric figures (EALRs 1.3.7, 1.3.1, 1.3.2).
2. Identify and describe the relative location of objects to one another; identify and describe the location of objects on a location grid (map, grid, number line); identify and construct simple geometric transformations using slides, flips, and turns (EALRs 1.3.3, 1.3.6).
3. Identify, describe, and compare parallel, perpendicular, and intersecting lines, as well as congruent, symmetrical, and similar figures, in two-dimensional and real-world constructions (EALRs 1.3.4, 1.3.5).

Strand 4
Probability and Statistics

1. Predict, show, and evaluate the possible outcomes and probabilities of simple experiments and activities; distinguish between certain and uncertain events; and compare predictions to experimental results (EALRs 1.4.1, 1.4.2, 1.4.3, 1.4.8).
2. Identify, describe, and evaluate methods for the effective collection of data (EALR 1.4.5).
3. Collect, organize, analyze, and display data in graphs, tables, charts, and other pictorial representations (e.g., icons); make and evaluate inferences from data and experimental results (EALRs 1.4.6, 1.4.9).
4. Identify, find, and use defined measures of central tendency (mean, median, mode) and other characteristics to describe a set or sets of data and sample populations (EALR 1.4.7).

Strand 5
Algebraic Sense

1. Recognize, create, and extend patterns of objects and numbers (EALR 1.5.1).
2. Identify and use appropriate symbols/notation to represent number patterns and operations and to translate problem situation into mathematical symbols (EALR 1.5.3).
3. Set up and solve simple equations at the concrete or pictorial level (EALR 1.5.6).

Strand 6
Solving Problems

1. Use, modify, create, and evaluate strategies and approaches to conduct exploration and perform operations (EALR 2.3.3).
2. Formulate questions; define problems; and identify patterns, questions to be answered, missing or unnecessary data, and unknowns (EALRs 2.2.1, 2.23, 2.1.3).
3. Collect needed information, select and use tools, use a variety of strategies, and apply concepts and procedures in constructing solutions (EALRs 2.1.2, 2.3.2).

Strand 7
Reasoning Logically

1. Compare and contrast information, and interpret information from a variety of sources (EALR 3.1.1).
2. Identify and use models, known facts, patterns, relationships, counterexamples, and deductive and inductive reasoning to validate thinking, support arguments, and evaluate procedures and results (EALRs 3.3.1, 3.1.2, 3.3.4).
3. Make inferences, predictions, and conclusion based on analysis of problem situations (EALR 3.2.1).

Strand 8
Communicating Understanding

1. Create a plan for collecting information (EALR 4.1.1).
2. Use reading, listening, and observation skills to gather, extract, and interpret mathematical information from a variety of sources—pictures, diagrams, models, text, symbolic representations, and technology (EALRs 4.1.2, 4.1.3).
3. Represent, organize, and express mathematical information, understanding, and ideas using models, tables, charts, graphs, written reflections, and algebraic notation, and explain these ideas in ways appropriate to a given audience (EALRs 4.2.1, 4.3.1, 4.3.2).

Strand 9
Making Connections

1. Link conceptual and procedural understanding among the areas of number sense, measurement, geometric sense, probability and statistics, and algebraic sense (EALR 5.1.1).
2. Use, create, and evaluate equivalent graphical, numerical, physical, algebraic, geometric, and verbal mathematical models and representations (EALR 5.1.2).
3. Identify and apply mathematical thinking, modeling, patterns, and ideas in other disciplines, real-life situations, and job-related applications (EALRs 5.2.2, 5.3.1, 5.3.2).

WASL format. The mathematics section of the WASL contains 40 items. Each form of the WASL includes 24 multiple-choice items worth one point each, 13 short-answer items worth two points each, and three extended-response items worth four points each.

Multiple-choice items represent over half of the test but only about 39 percent of the total points. Each multiple-choice item has three to four responses to choose from—one correct response and at least two responses that are incorrect.

Short-answer items require students to construct short responses such as writing a sentence or equation; completing a table, graph, or chart; drawing a picture; constructing a diagram; or performing a calculation. Short-answer items are scored using a three-level scoring guide (0–2), in which students either receive full credit, partial credit, or no credit.

All extended-response items in the mathematics section are constructed for the four process strands only. Extended-response items require students to perform tasks such as creating a graph showing the appropriate data, labeled axes, and title; creating and/or extending tables, diagrams, or pictures; providing a lengthy written explanation; and giving a written explanation with number sentences, pictures, and/or diagrams. Extended-response items are scored using a five-level scoring guide (0–4), in which student responses are determined extensive, essential, partial, minimal, and unacceptable/nonresponsive.

WASL Points for Short-Answer Items

Points	Level	Description
2	Full credit	· Shows complete understanding of the concept or task. · Consistent and correct use of applicable information or procedures. · Logical reasoning and conclusions. · Correct set-up and computations.
1	Partial credit	· Shows partial understanding of the concept or task. · May contain flawed reasoning. · May neglect to address some applicable information or aspect of the task. · May contain a computational error.
0	No credit	· Shows little or no mathematical understanding of the concept or task.

WASL Points for Extended-Response Items

Points	Level	Description
4	Extensive	· Represents an effective solution that meets all relevant criteria. · Shows complete understanding of the concept or task. · Consistently and correctly uses or addresses all applicable · information, procedures, or points relevant to the solution. · Shows logical reasoning and valid conclusions. · Communicates effectively and clearly using words, numbers, pictures, diagrams or any combination of these. · Includes correct computation and set up.
3	Essential	· Shows a mostly effective solution/approach and meets most relevant criteria. · Shows general understanding of the concept or task. · Uses most applicable information or addresses most relevant points. · Communicates adequately though writing and diagrams, and generally reaches reasonable conclusions. · May show some flawed or incomplete reasoning. · Missing, incorrect, or weak/incomplete computation. · May neglect to address some aspect of the task.
2	Partial	· Meets some relevant criteria and uses some applicable information and procedures. · Shows gaps in understanding and execution. · Occasionally uses applicable information and procedures with some combinations of the following flaws: · Partial understanding of the concept or task. · Failure to use most information or address the majority of points relevant to the solution. · Faulty reasoning. · Weak conclusions. · Unclear communication in writing and diagrams. · Incomplete understanding of relevant mathematical procedures or concepts.
1	Minimal	· Shows some effort beyond restating the task or copying given data but meets few relevant criteria. · May be disorganized and difficult to understand, or may be organized but off-task. · Shows some combination of the following flaws: · Little understanding of the concept or task. · Failure to use most applicable information or address most aspects of the task or solution. · Major flaws in reasoning. · Invalid and/or unsupported conclusions. · Poor understanding of relevant mathematical procedures or concepts.
0	Unacceptable /nonresponsive	· Shows little or no mathematical understanding of the concept or task.

Students receive a total mathematics score that is used to determine whether or not the student met the standard. These scores range from 150 to 600, with a score of 400 being the minimum score for meeting the standard. The assessment also includes nine subscale reports for each strand.

Basic operations with whole numbers. Successful performance on the WASL requires facility with basic operations with whole numbers. The table below shows which whole number operations may be assessed at the WASL administered at fourth grade. More complex operations are assessed using tools.

Whole Number Operations Assessed by the WASL

Operation	Without Tools	With Tools
Addition	Two three-digit numbers	Three-digit numbers
Subtraction	Two three-digit numbers	Two four-digit numbers
Multiplication	One-digit multiplier (or multiple of ten) and two-digit multiplicand	Two-digit multiplier and two-digit multiplicand (or three-digit multiple of ten)
Division	One-digit divisor Two digit-dividend	Two-digit divisor Four-digit dividend

WASL mathematics vocabulary. Successful performance on the WASL requires the ability to understand written mathematical vocabulary and to read text containing mathematical terms. The table on the next two pages lists vocabulary and math terms fourth grade students may encounter on the WASL. The table is organized to highlight whether students need to understand a mathematical term prior to taking the WASL in fourth grade or whether the term is defined in the test or accompanied by examples in the test.

WASL Mathematics Vocabulary

Vocabulary/ Math Terms	Need to Understand	Defined in Test	Accompanied by Examples
fraction	X		
denominator		X	
numerator		X	
mixed number			X
number line	X		
standard form	X		
expanded form	X		
word form	X		
equation	X		
number sentence	X		
operation	X		
sum	X		
difference	X		
factor		X	
product		X	
quotient		X	
multiple		X	
remainder		X	
estimate	X		
combine			X
in., lb., cm., g	X		
standard units of measurement			X
nonstandard units of measurement			X
side	X		
right angle	X		
circle	X		
triangle	X		
square	X		
rectangle	X		
pentagon	X		
hexagon	X		
octagon	X		
cube	X		
pyramid	X		
cylinder	X		
cone	X		
sphere	X		
faces	X		
edges	X		
parallelogram		X	
rhombus		X	
hexagon		X	
octagon		X	
quadrilateral		X	
vertex/vertices		X	
plane figure		X	
grid	X		
slide	X		
flip	X		
turn	X		
ordered pair	X		

parallel	X		
perpendicular	X		
intersecting	X		
congruent	X		
similar	X		
symmetrical	X		
line of symmetry	X		
probability	X		
survey	X		
sample	X		
scale	X		
bars	X		
pattern	X		
trend	X		
axis/axes		X	
average (i.e., mean)	X		
mean		X	
median		X	
mode		X	
rule	X		
process	X		

How Mathematics Is Assessed in the CBE

The Washington Model for Classroom-Based Evidence was developed by the Commission on Student Learning. These CBEs are part of the assessment toolkits that have been distributed throughout the state to school districts through the ESDs since 1997. CBEs provide activities, discussion questions, assessment suggestions, and scoring criteria for teachers to gather information about student ability to perform the essential academic learning requirements.

These resources have been prepared as reproducibles called student masters (SMs). The two CBEs for early years mathematics are “Preparing to Solve Math Problems” and “Communicating through Mathematics.” The student masters and the relevant EALRs that the activities are designed to assess are listed below:

“Preparing to Solve Math Problems” and “Communicating through Mathematics.” The scoring criteria that accompanies “Preparing to Solve Math Problems” and “Communicating through Mathematics” can be used to assess student acquisition of both problem solving skills as well as group interaction skills. The criteria includes a five-point scale for rating concept and skill development. Four (4) denotes that the student meets all relevant criteria; three (3) denotes that the student meets most relevant criteria; two (2) denotes that the student meets some relevant criteria; one (1) denotes that the student meets few relevant criteria; and zero points (0) denotes a not scorable response.

Scoring Criteria for "Preparing to Solve Math Problems"

	Solving Problems	Accuracy and Appropriateness	Concepts and Procedures
4 points Meets *all* relevant criteria	· Shows clear and accurate understanding of the task. · Effectively explores the problem, evaluates strategies, and clarifies patterns and problems. · Organizes information, selects appropriate tools and strategies, and uses appropriate mathematical concepts and procedures. · Develops an effective solution.	· Solutions, constructions, and/or results are complete and accurate. · Choices of procedures are appropriate to the requirements of the task. · Displays, if required, are clear, accurate, and appropriate. · Uses appropriate units, operations, and/or tools skillfully and accurately.	· Understanding of concepts and procedures both within and beyond the task. · Consistently and purposefully applies appropriate concepts and procedures.
3 points Meets *most* relevant criteria	· Shows understanding of the task and how to explore problems. · Shows understanding of how to evaluate strategies, clarify patterns and problems, organize information, or select appropriate tools and strategies. · Uses appropriate mathematical concepts and procedures. · Develops a viable solution, but minor gaps or errors may limit solutions.	· Solutions, constructions, and/or results are complete and mostly accurate. · Choices of procedures are mostly appropriate to the requirements of the task. · Displays, if required, are appropriate, clear, and mostly accurate. · Uses appropriate units, operations, and/or tools accurately.	· Shows thorough understanding of concepts and procedures required by the task. · Consistently applies appropriate concepts and procedures.
2 points Meets *some* relevant criteria	· Shows some understanding of the task and how to explore problems. · Shows some understanding of how to evaluate strategies, clarify patterns and problems, organize information or select appropriate tools and strategies. · Uses mostly appropriate mathematical concepts and procedures. · Develops a solution, but gaps or errors limit viability of solution.	· Solutions, constructions, and/or results are partially complete and/or partially accurate. · Choices of procedures may not be appropriate to the requirements of the task. · Displays, if required, are appropriate, but may be unclear or inaccurate. · Uses units, operations, and/or tools that are partially appropriate or partially accurate.	· Shows general understanding of concepts and procedures required by the task. · Generally applies appropriate concepts and procedures.
1 point Meets *few* relevant criteria	· Shows little understanding of the task or how to explore the problem, evaluate strategies, clarify patterns and problems, organize information, or select appropriate tools and strategies. · Develops a solution, but major gaps, errors, or poor conceptual understanding prevent a viable solution.	· Solutions, constructions, and/or results are incomplete and/or mostly inaccurate. · Choices of procedures may not be appropriate to the requirements of the task. · Displays, if required, are somewhat appropriate, but they may be unclear or inaccurate.	· Shows rote or partial under-standing of concepts and procedures required by the task. · Occasionally applies appropriate concepts and procedures.
0 point or Not Scorable (NS) response	· Shows little or no understanding of the task. · Provides no evidence of problem solving skills. · The prompt may simply be recopied, or the response may indicate "I don't know" or a question mark.	· Completely inaccurate, unreadable, or off target.	· Attempted with no understanding of the concepts and procedures, no attempt, off topic, can't be read.

Scoring Criteria for "Communicating through Mathematics"

	Math Communication	Accuracy and Appropriateness	Concepts and Procedures
4 points Meets *all* relevant criteria	· Student gathers all applicable information from appropriate sources. · Demonstrates interpretations and understandings in a clear, systematic, and organized manner. · Represents mathematical information and ideas in an effective format for the task, situation, and audience.	· Solutions, constructions, and/or results are complete and accurate. · Choices of procedures are appropriate to the requirements of the task. · Displays, if required, are clear, accurate, and appropriate. · Uses appropriate units, operations, and/or tools skillfully and accurately.	· Understanding of concepts and procedures both within and beyond the task. · Consistently and purposefully applies appropriate concepts and procedures.
3 points Meets *most* relevant criteria	· Student gathers applicable information from appropriate sources. · Demonstrates interpretations and understandings in a clear and organized manner. · Represents mathematical information and ideas in an expected format for the task, situation, and audience.	· Solutions, constructions, and/or results are complete and mostly accurate. · Choices of procedures are mostly appropriate to the requirements of the task. · Displays, if required, are appropriate, clear, and mostly accurate. · Uses appropriate units, operations, and/or tools accurately.	· Shows thorough understanding of concepts and procedures required by the task. · Consistently applies appropriate concepts and procedures.
2 points Meets *some* relevant criteria	· Student gathers information from appropriate sources. · Demonstrates interpretations and understandings in an understandable manner. · Represents mathematical information and ideas in an acceptable format for the task, situation, and audience.	· Solutions, constructions, and/or results are partially complete and/or partially accurate. · Choices of procedures may not be appropriate to the requirements of the task. · Displays, if required, are appropriate, but may be unclear or inaccurate. · Uses units, operations, and/or tools that are partially appropriate or partially accurate.	· Shows general understanding of concepts and procedures required by the task. · Generally applies appropriate concepts and procedures.
1 point Meets *few* relevant criteria	· Student gathers little information from appropriate sources. · Demonstrates interpretations and understandings in a manner that is disorganized or difficult to understand. · Represents mathematical information and ideas in a format that is inappropriate for the task, situation, and audience.	· Solutions, constructions, and/or results are incomplete and/or mostly inaccurate. · Choices of procedures may not be appropriate to the requirements of the task. · Displays, if required, are somewhat appropriate, but they may be unclear or inaccurate.	· Shows rote or partial understanding of concepts and procedures required by the task. · Occasionally applies appropriate concepts and procedures.
0 point or Not Scorable (NS) response	· Shows little or no understanding of the task. · Provides no evidence of problem solving skills. · The prompt may simply be recopied, or the response may indicate "I don't know" or a question mark.	· Completely inaccurate, unreadable, or off target.	· Attempted with no understanding of the concepts and procedures, no attempt, off topic, can't be read.

How to Use CBEs

Like other instructional materials, CBEs are designed so teachers can (1) use these materials as they have been prepared, (2) use them with adaptations, or (3) use them to create other high-quality assessments.

Use CBEs as is. You can use the classroom-based evidence models taking into account the current performance levels of your students. Specific instructions are provided for teachers in each of the CBEs. It is important to note that CBEs were not designed for students to work through without teacher guidance and support. Furthermore, it is important to know the grade level for which each of the CBEs were intended. Most CBEs specify the grade level for which they have been written.

Using CBEs with adaptations. You can tailor the classroom-based evidence models to your students' needs by supplementing them with your own assessment materials and strategies. Some student masters are designed specifically to go with the mathematics selection that accompanies the model; other student masters may be used with any mathematics selection you may want to use with your students.

Marilyn Friend and William Bursuck (1986) identified adaptations that may be used before, during, and after the assessment period. The table below identifies some of the possible adaptations that can be used to enhance the use of the CBEs.

Before Assessment	During Assessment	After Assessment
· Study guides. · Practice assessment. · Teaching assessment-taking skills. · Modified assessment construction. · Individual tutoring.	· Alternative forms of response. · Alternative means of response. · Alternative sites. · Direct assistance. · Extra time.	· Change letter or number grades. · Change grading criteria. · Use alternatives to number and letter grades. · Follow-up instruction.

Adaptations before the assessment. When using CBEs or administering any other classroom-based assessments to a group of children that includes students with disabilities, teachers should consider how easily a classroom assessment can be adapted for use with the students.

- ***Study guides***. Teachers can develop study guides for students to use as they complete an assessment from the CBE. Such study guides would define words, draw student attention to key concepts, and basically lead the student through the materials in a way that supports successful completion of the tasks.

- ***Practice assessments***. Teachers can prepare activities similar to those found in the student masters and help students become familiar with the assessment tasks prior to using the student masters with the rest of the class. Like a study guide, the practice assessment provides support for the student in terms of an additional practice opportunity.

- ***Teaching assessment-taking skills***. Teachers can provide students with direct instruction on specific assessment-taking strategies. Part of such instruction might include helping students understand the vocabulary used in assessments. A list of key words used in short-answer and extended-response items and their definitions appears on the following page.

Key Words in Short-Answer or Extended-Response Questions

Key Word	Definition

Compare	Show similarities.
Contrast	Show differences between things.
Define	Give the formal meaning of a term.
Describe	Tell in detail about something.
Diagram	Give a drawing and label it.
Discuss	Give details and, if relevant, the positive and negative points of a subject as well as evidence for these positions.
Evaluate	Give the positive and negative points of a subject as well as your judgment about which outweighs the other and why.
Illustrate	Explain by giving examples.
Interpret	Explain the meaning of something.
List	Give a series of points and number them 1, 2, 3 . . . .
Outline	Give the main points and important secondary points. Put main points at the margin and indent secondary points under the main points. Relationships may also be described with logical symbols, as follows: 1. _____ a. _____ b. _____ 2. _____
State	Give the main points.
Summarize	Give a condensed account of the main points.

Adapted from ***Reading and Study Skills*** (2nd ed.) by J. Langan, 1982, p. 193, New York: McGraw-Hill.

- ***Modified assessment construction***. Teachers can adapt the response mode for items. For example, to adapt a multiple-choice assessment item, the teacher could reduce the number of choices. The table below shows some additional options to the traditional assessment formats.

Options for Modifying Assessment Construction

Format	Alternative Response Forms
Multiple-choice	· Provide yes-or-no questions. · Reduce the number of choices. · Provide more information from which to make a choice. · Use matching items.
Short-answer	· Provide a listing of facts and information to use in the answer. · Allow the student to list information or choose from several prepared short answers. · Use the cloze technique in prepared paragraphs. · Scramble information to be arranged.
Essay	· Provide a partial outline for the student to complete. · Allow the student to tape record answers, note important points to be included in the response. · Use take-home assessments to allow for extra time.

Adaptations during the assessment. An important question for teachers to ask regarding classroom-based assessment for a student with a disability is whether the student can be appropriately and meaningfully assessed using the same conditions under which the CBE is completed by other students.

- ***Alternative presentation modes***. CBEs may be adapted in improved type, large-type, Braille, and audiocassette versions for those with visual disabilities. Teachers may want to consider providing a reader or a cassette tape of the assessment items. Tapes allow the student to hear instructions and items as well as read them. Also, tapes are convenient for assessment make-ups.

- ***Alternative means of response***. An amanuensis (a scribe), a sign language interpreter, and a tape recorder to register answers are adaptations that might be used by a student to complete a CBE.

- ***Alternative sites***. Teachers may need to consider alternative locations for students to complete a CBE. Moreover, some accommodations permit continued administration in group settings while others require individual administration.

- ***Direct assistance.*** Clarifying directions or the meaning of key vocabulary are examples of direct assistance teachers may provide for students completing CBEs.

- ***Alternative times***. Time limits can be enforced, extended, or waived altogether for students completing CBEs. Students also may be given extra rest pauses.

Adaptations after the assessment. When a teacher adapts a CBE for an individual student, caution should be exercised in interpreting results. Results of an adapted CBE are best interpreted by developing hypotheses as opposed to making decisions. The goal of any interpretation of an adapted CBE should be an expected result on the comparable CBE. Teachers need to know how the person taking an adapted form of a CBE would have performed if he or she could have taken the assessment under standardized conditions.

- ***Change letter or number grades***. Use language reflecting performance levels rather than letter grading (e.g., A, B, C, etc.).

- ***Change grading criteria***. Grade on improvement over present levels rather than in terms of grade-level criteria.

- ***Use alternatives to number and letter grades***. Use narrative reports to provide explicit feedback on areas of strength and weakness.

- ***Follow-up instruction***. Provide group-based or tutorial lessons on areas of skill deficiency.

Using CBEs to create high-quality assessments. Teachers can use the classroom-based evidence models to create their own high-quality assessments. This is advisable for several reasons. First, developing classroom assessments can increase teacher understanding of the EALRs and help them recognize the characteristics of quality work that define the standards in the various subject areas.

Second, standardized achievement tests offer teachers limited options for adapting assessment tasks. In contrast, teachers have much flexibility in designing and constructing responsive classroom assessments. For example, teachers may use

alternative response forms when existing formats appear to be a barrier to student performance on classroom assessments. Such modifications often allow students to demonstrate their achievements more effectively.

Teachers may also want to create their own assessments to evaluate broader outcomes for their students. Typical tests tend to overassess student "knowledge" and underassess student "know-how with knowledge." For example, a more traditional map reading assignment would have students compute the mileage between several cities using a mileage key. In contrast, activities found in CBEs would have students create their own maps, within a real context, to show how well they can apply what they have learned to an actual problem.

Developing classroom assessments can increase teacher understanding of the EALRs and help them recognize the characteristics of quality work that define the standards in the various subject areas.

Developing and evaluating tasks for performance-based assessments. Performance-based assessments, like standardized assessments and curriculum-based assessments, must be carefully designed and scored so that they can provide information that is helpful for instruction and that is viewed with credibility by parents, students, and administrators. Grant Wiggins (1992) outlined a number of considerations in designing, administering, and scoring performance-based assessments:

1. Assessment tasks should be, whenever possible, authentic and meaningful—worth learning.

2. The set of tasks should be a valid sample from which apt generalizations about overall performance of complex capacities can be made.

3. The scoring criteria should be authentic, with points awarded or taken off for essential successes and errors, not for what is easy to count or observe.

4. The performance standards that anchor the scoring should be genuine benchmarks, not arbitrary cut scores or provincial norms.

5. The context of the problems should be rich, realistic, and enticing—with inevitable constraints on access to time, resources, and advance knowledge of the tasks and standards appropriately minimized.

6. The tasks should be validated.

7. The scoring should be feasible and reliable.

8. Assessment results should be reported and used so that all customers for the data are satisfied.

Adapted tasks for CBEs. A list of adapted tasks for each student master has been developed to illustrate possible ways of adapting the CBE for "Preparing to Solve Math Problems." A "guiding question" summarizes the overall task included in the student master. The adapted task illustrates one possibility for collecting information to answer the guiding question.

Guiding Questions to "Preparing to Solve Math Problems"

Guiding Question	Adapted Task
SM 1 Can students read a passage describing mathematics problem solving?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 2 Can students read and interpret a chart showing the five steps for solving mathematics problems?	Cut the five steps out and show each step individually to focus student attention.
SM 3 Can students read a passage describing the first step that can be used to solve problems?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 4 Can students read a passage describing the second step that can be used to solve problems? Can students orally answer questions about strategies they use to solve problems?	Read the selection aloud or tape record the text so that students can listen while they read along. Explain to students that they will learn more about the 11 strategies listed in the illustration in other student masters.
SM 5 Can students read a passage describing the third step that can be used to solve problems?	Read the selection aloud or tape record the text so that students can listen while they read along. Demonstrate the two strategies that are described in the text.
SM 6 Can students read a passage describing the fourth step that can be used to solve problems?	Read the selection aloud or tape record the text so that students can listen while they read along. Have students list how the two responses are the same and how they are different.
SM 7 Can students read a passage describing the fifth step that can be used to solve problems?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 8a Can students read a passage listing 11 problem solving strategies?	
SM 9 Can students read a passage describing the make a chart/look for a pattern strategy?	
SM 10 Can students read a passage describing the working backward strategy?	
SM 11 Can students read a passage describing the solve a simpler problem strategy?	
SM 12 Can students read a passage describing the use estimation strategy?	
SM 13 Reviewing the five steps for problem solving.	
SM 14 Review checklist.	
SM 15 Can students complete a problem solving activity involving measurement?	
SM 16 Can students complete a problem solving activity involving algebraic sense?	
SM 17 Can students complete a problem solving activity involving geometric sense?	

SM 18 Can students complete a problem solving activity involving number sense or algebraic sense?	
SM 19 Can students complete a problem solving activity involving geometric sense?	
SM 20 Can students complete a problem solving activity involving algebraic sense?	
SM 21 Can students complete a problem solving activity involving number sense?	
SM 22 Can students complete a problem solving activity involving number sense?	
SM 23 Can students complete a problem solving activity involving number sense?	
SM 24 Can students complete a problem solving activity involving probability?	
SM 25 Can students complete a problem solving activity involving probability?	
SM 26 Can students complete a problem solving activity involving measurement?	
SM 27 Can students complete a problem solving activity involving algebraic sense?	
SM 28 Can students complete a problem solving activity involving mathematical reasoning?	
SM 29 Can students complete a problem solving activity involving geometric sense?	
SM 30 Can students read and answer five questions regarding their mathematics problem solving abilities before completing the CBE?	
SM 31 Can students read and answer five questions regarding their mathematics problem solving abilities after completing the CBE?	
SM 32 Can students read and complete a worksheet outlining the five-step problem solving strategy?	
SM 33 Can students read and complete a checklist of the five-step problem solving model?	
SM 34 Can students read a passage outlining scoring criteria?	

Guiding Questions to "Communicating through Mathematics"

Guiding Question	Adapted Task
SM 1 Can students read a passage defining "communication"?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 2a–c Can students explain how people communicate only with words?	Read the selection aloud or tape record the text so that students can listen while they read along. Have students act out the telephone conversation between Tanya and Josh.
SM 3a–b Can students read a passage and complete an activity about communicating with numbers?	Read the selection aloud or tape record the text so that students can listen while they read along. Have students work in groups to complete exercises.
SM 4a–b Can students read a passage explaining how to gather information to answer a mathematics question?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 5 Can students identify the first step in gathering information?	Read the selection aloud or tape record the text so that students can listen while they read along. Put the six questions on sentence strips and have students read the questions separately.
SM 6a–d Can students read a passage explaining how to create a plan to gather information?	Read the selection aloud or tape record the text so that students can listen while they read along. Help students recite the six-part acronym as you read each step individually.
SM 7a–b Can students read a passage about using a tally sheet?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 8a–e Can students read a passage about charts and tables, diagrams, graphs?	Read the selection aloud or tape record the text so that students can listen while they read along. Reinforce the definitions of ***charts and tables, diagrams,*** and ***graphs.***
SM 9 Can students read and interpret a vertical bar graph?	Read the selection aloud or tape record the text so that students can listen while they read along.
SM 10a–c Can students answer aquestion using information in a bar graph?	Have the students dictate the answer to the question.
SM 11 Can students read a passage reviewing the four ideas for communicating with mathematics?	Have students dictate the four ideas for communicating with mathematics.
SM 12a–b Can students complete activities that correlate measurement with math communication?	Read the activity and have students dictate their responses.
SM 13a–d Can students complete activities that correlate measurement with math communication?	Read the activity and have students dictate their responses.
SM 14a–c Can students complete activities that correlate number sense with math communication?	Read the activity and have students dictate their responses.
SM 15a–b Can students complete math connections with math communication?	Read the activity and have students dictate their responses.

SM 16a–b Can students complete math connections with math communication?	Read the activity and have students dictate their responses.
SM 17a–e Can students complete activities that correlate probability and statistics with math communication?	Read the activity and have students dictate their responses.
SM 18a–c Can students complete activities that correlate probability and statistics with math communication?	Read the activity and have students dictate their responses.
SM 19 Can students complete activities that correlate algebraic sense with math communication?	Read the activity and have students dictate their responses
SM 20a–c Can students complete activities that correlate math connections with math communication?	Read the activity and have students dictate their responses.
SM 21a–d Can students complete activities that correlate geometric sense with math communication?	Read the activity and have students dictate their responses.
SM 22 Can students complete activities that correlate geometric number sense with math communication?	Read the activity and have students dictate their responses.
SM 23 Can students complete activities that correlate math connections with math communication?	Read the activity and have students dictate their responses.
SM 24a–c Can students complete activities that correlate math connections with math communication?	Read the activity and have students dictate their responses.
SM 25a–e Can students complete activities that correlate measurement with math communication?	Read the activity and have students dictate their responses.
SM 26a–c Can students complete activities that correlate probability and statistics with math communication?	Read the activity and have students dictate their responses.
SM 27a–b Can students confer with teacher regarding math journal?	Read the activity and have students dictate their responses.
SM 28a–b Can students answer questions about math communication?	Read the activity and have students dictate their responses.
SM 29a–b Can students complete a problem solving activity involving geometric sense?	Read the activity and have students dictate their responses.

Alternate Teaching Strategies for Mathematics

Teachers can adapt mathematics instruction to enhance their students' achievement in many ways. This resource guide presents alternate teaching procedures that have been research-validated and originally appeared in such research journals as the ***Elementary School Journal, Exceptional Children, Journal of Educational Psychology, Journal of Learning Disabilities, Journal of Special Education,*** and ***Learning Disabilities Quarterly.*** Teaching strategies have been described only for those components of the essential learnings for which a research study was located that specifically addressed the component.

Essential Academic Learning Requirement	Alternate Teaching Strategy
1.1 understand and apply concepts and procedures from number sense (number and numeration, computation, and estimation)	· Place Value Instruction Using a Three-Level Teaching Sequence (Peterson, Mercer, and O'Shea, 1988) · Addition Series Saying (Carnine and Stein, 1981) · Count-Bys for Multiplication (McIntyre, Test, Cooke, and Beattie, 1991) · Multiplication Strategy (Lloyd, Saltzman, and Kauffman, 1981) · Demonstration Plus Permanent Model Technique for Long Division (Rivera and Smith, 1988) · Self-Instruction Strategy for Mathematical Computation (Leon and Pepe, 1983)
1.2 understand and apply concepts and procedures from measurement	
1.3 understand and apply concepts and procedures from geometric sense (shape and dimension, relationships and transformations)	
1.4 understand and apply concepts and procedures from probability and statistics (probability, statistics, prediction and inference)	
1.5 understand and apply concepts and procedures from algebraic sense (relations and representations, operations)	
2.1 investigate situations	· Using Math Manipulatives for Problem Solving (Marsh and Cooke, 1996) · Self-Regulated Strategy for Mathematical Problem Solving (Case, Harris, and Graham, 1992)
2.2 formulate questions and define the problem	· Student-Produced Mathematics Problems (Parmar and Cawley, 1991)
2.3 construct solutions (by choosing the necessary information and using the appropriate mathematical tools)	
3.1 analyze information (from a variety of sources; use models, known facts, patterns, and relationships to validate thinking)	
3.2 predict results and make inferences (and make conjectures based on analysis of problem situations)	

3.3 draw conclusions and verify results (support mathematical arguments, justify results, and check for reasonableness of solutions)	
4.1 gather information (read, listen, and observe to access and extract mathematical information)	
4.2 organize and interpret information	
4.3 represent and share information (share, explain, and defend mathematical ideas using terms, language, charts, and graphs that can be clearly understood by a variety of audiences)	
5.1 relate concepts and procedures within mathematics (recognize relationships among mathematical ideas and topics)	
5.2 relate mathematical concepts and procedures to other disciplines (identify and apply mathematical thinking and notation in other subject areas)	
5.3 relate mathematical concepts and procedures to real-life situations (understand the connections between mathematics and problem-solving skills used every day at work and at home)	

Place Value Instruction Using a Three-Level Teaching Sequence
(Peterson, Mercer, and O'Shea, 1988)

Essential Learnings
1.1.1 Use objects, pictures, or symbols to demonstrate understanding of whole and fractional numbers, place value in whole numbers, and properties of the whole number system.
1.1.2 Identify, compare, and order whole numbers and simple fractions.

Background and Research Question
Susan K. Peterson, Cecil D. Mercer, and Lawrence O'Shea examined the effectiveness of a three-level teaching sequence on the learning of place value by students with learning disabilities. The sequence included concrete, semiconcrete, and abstract (CSA) teaching stages. In the concrete stage, the concept of place value was taught using manipulative objects such as sticks. In the semiconcrete stage, pictorial representations were used in the instruction. In the abstract stage only numbers were used. Twenty-four elementary and middle school students with learning disabilities (ages 8–13) participated in this study.

Half of the students were randomly assigned to the experimental group; the other half were assigned to the control group which received a traditional teaching method using numbers only. Results indicated that the students in the experimental group outperformed students in the control group on acquisition-level measures. Students who were taught place value using the CSA teaching sequence performed significantly better on the posttest measures than students who were taught the same skill abstractly.

Translating Research Into Practice
A sample teaching script for each of the three CSA teaching stages appears on the following three pages.

Identifying Ones and Tens Concretely With Cubes

(Sample Teaching Script for Concrete Lesson)

Advance organizer. **"Today we are going to practice counting ones and tens using cubes. This will help us understand the meaning of two-digit numbers such as 15, 24, 32, 67."** (Write these numbers on the chalkboard as you read them.) **"Notice these numbers have two digits. One digit is the ones** (point to the ones) **and the other is the tens** (point to the tens). **Before we start let me show you the materials we'll use. These are cubes. What are they? . . . Yes, cubes. These are place value cards. What are they? . . . Yes, place value cards. Good! Let's begin."**

Demonstrate/model. (Have three groups of cubes on the table; one group of 23, one of 15, and one of 32.) **"I'm going to count the first group of cubes and put them in groups of tens and ones."** (Count 23 cubes and then group them in tens and ones. Interlock the cubes that represent tens. Leave the ones cubes unconnected.) **"Now I'm going to write how many tens I counted. How many tens? . . . Yes, I counted two tens."** (Write 2 on place value chart.) **"How many ones do I have? . . . Yes, I counted three ones."** (Write 3 on the place value chart.) **"Another way to write this number is 23."** (Write 23 on the chalkboard.) **"This number is twenty-three. The number on the far right is in the ones place. The number two places over** (count and point) **is in the tens place. What number is two places over? Yes, the tens."** (Repeat this procedure demonstrating 15 and 32.)

Guided practice. (Give the student 35 cubes.) **"You count and put the cubes in groups of tens and ones."** (Teacher and student each count 35 cubes and group them by tens and ones.) **"How many tens did we count? . . . We counted three tens. Write 3 in the tens column on your place value chart . . . How many ones did we count? We counted five ones. Write 5 in the ones column. . . . Another way to write the 3 tens and 5 ones is 35. Write 35 on the other side of your card. Where is the ones place? Yes, on the far right. Where is the tens place? Yes, two places over."** (Repeat this procedure with the numbers 43, 19, and 20.)

Independent practice. (Give the student 26 cubes.) **"Now you count and put the cubes in groups of tens and ones. Remember to record the number on your place value card."** (Have students repeat independent practice with the numbers 72, 10, and 12.)

Criterion. Four out of four or 100 percent performed correctly. Repeat practice until criterion is met.

Identifying Tens and Ones Semiconcrete With Stick Pictures

(Sample Teaching Script for Semiconcrete Lesson)

Advance organizer. **"I'm very proud of the work you've been doing with place value. You can show me tens and ones using plastic cubes** (hold up cube), **place value sticks** (hold up sticks), **and place value strips** (hold up strip). **That's very good. Today we're going to practice counting pictures of place value sticks. We'll be looking at tens and ones. We'll complete four worksheets together and then take our one-minute timing."** (Distribute worksheet.) **"Put your finger on the bear. . . Good following directions. This bear's name is Super 10. He's named Super 10 because he loves bundles of tens. Look at the flag he's carrying. How many bundles of tens are on the flag? . . . Yes, there are two. So how many tens are there? Yes, there are two. So how many tens are there? Yes, two. And how many ones are there? . . . . That's right, zero. So two tens and zero ones is written like this."** (Point to the number 20.) **"Two tens and zero ones is another name for? . . . Yes, 20. Very good. Now look at my sheet."** (Point to one bundle of ten.) **"How many tens? Yes, one. How many ones left over? . . . Right, there are no ones. So one bundle of ten and zero ones is another name for? . . . Yes, ten."** (Point to the number ten. Repeat this oral practice for the numbers 20 through 90.) **"You did a super job. Now we're ready to begin our worksheet."**

Demonstrate/model. Look at my sheet. I'm going to count the number of tens." (Point as you count.) "One, two, three, four. So, write four next to the word tens like this." (Trace the four.) "There are four tens. Since there are no ones to count, I know the number is (trace the 40) four tens and zero ones or 40. So, first I counted and wrote the number of tens. Then I wrote the other names which includes tens and ones."

Guided practice. **"Now you count the bundles of ten. How many? . . . Yes, four."** (Trace the four next to the word tens**.) "So what is the other name? . . . Yes, four."** (Trace the four next to the word tens**.) "So what the name? . . . Yes, forty."** (Trace the four tens and zero ones.) **"Good job. Let's do the next one together. How many tens? . . . Yes, two."** (Write two next to the word tens**.) "The other name for two tens is two tens and zero ones or 20. Write this other name in the blank . . . Good work! Now I'd like you to finish this page and worksheet number two by yourself. When you finish, put your pencil down, so I'll know you're ready to go on."**

Independent practice. (Distribute worksheet number two**.) "The problems on this sheet are done the same way. Remember to do your best work."**

Advance organizer. **"You did a good job working by yourself. Now we're ready to go on to worksheet number three."** (Distribute worksheet number three.)

Criterion. On part one, 12 out of 14, or 86 percent, performed correctly. On part two, 11 out of 13, or 85 percent, performed correctly. Repeat practice until criterion is met.

Identifying Tens and Ones Abstractly With Worksheet and Cards
(Sample Teaching Script for Abstract Lesson)

Advance organizer. **"You've done so well with counting tens and ones using pictures that you're ready to do place value without pictures. After today's lesson you'll understand tens and ones without pictures. That's great. After we practice place value with numbers only, we'll do our one-minute timing."**

Demonstrate/model. (Hold up a place value card showing 56.) **"This number is 56. In the number 56, the number two places over stands for tens. So there are five tens in this number. The number on the far right stands for ones. So there are six ones in this number. I'll write the tens in the ten column and the ones in the one column on the opposite side of the card."** (After writing the numbers, give the student a stack of place value cards.)

Guided practice. **"You look at the number and decide how many tens and ones there are in the number. Then turn your card over and write your answer in the correct columns. I'll watch and help as needed . . . Good job."**

Independent practice. **"Now complete the stacks by yourself. When you've finished practicing with the cards, I'd like you complete this worksheet."** (Distribute worksheet.) **"Do your best work on both the cards and the worksheet."**

Criterion. On the place value cards, the student must get 16 out of 20 or 80 percent performed correctly. On the worksheet, the student must get 12 out of 15 or 80 percent performed correctly.

Source

Peterson, S., Mercer, C., and O'Shea, L. (1988). Teaching learning disabled students place value using concrete to abstract sequence. ***Learning Disabilities Research, 4***(1), 52–56.

Addition Series Saying
(Carnine and Stein, 1981)

Essential Learning
1.1.4 Add, subtract, multiply, and divide whole numbers.

Background and Research Question
Douglas W. Carnine and Marcy Stein conducted two studies investigating the effectiveness of a strategy for teaching basic facts to preschool and first grade children. In both studies, the students were taught to say related facts that demonstrated the counting relationship between successive facts (6 + 1 = 7; 6 + 2 = 8; 6 + 3 = 9).

Carnine and Stein hypothesized that teaching students to say related facts would result in higher retention scores than practice that included fact families but did not include verbalization of the facts nor emphasize the counting relationship among the facts. Results indicated that students taught the series-saying strategy learned more facts and were able to achieve greater accuracy and stronger maintenance of facts over time. The researchers emphasized that the series-saying strategy supplement and not replace meaningful basic fact instruction using concrete and semiconcrete objects.

Translating Research Into Practice
1. Write on the board a set of four consecutively ordered basic math facts (e.g., 4 + 2 = 6, 4 + 3 = 7, 4 + 4 = 8, 4 + 5 = 9).

2. Have students read the consecutively ordered facts. Repeat this step until students can read each fact at a rate of a fact each three seconds.

3. Erase the answers and have the students say the series from memory (e.g., 4 + 2 = , 4 + 3 = , 4 + 4 = , 4 + 5 =). Respond with students until they answer correctly and then ask individual students to solve the series.

4. Erase the problems and have the students say the series from memory. Repeat this step until students answer correctly and then ask individual students to respond. If the student cannot recall or makes an error, go back to the first fact in the set and emphasize the counting order relationships again. Ask, “If 4 + 2 = 6, then 4 + 3 = what?”

5. Write the facts in random order 4 + 4 = , 4 + 2 = , 4 + 3 = , 4 + 5 =). Point to each fact, pause, then have students respond. Repeat the facts until students can respond with a one-second pause.

Source
Carnine, D.W. and Stein, M. (1981). Organizational strategies and practice procedures for teaching basic facts. ***Journal for Research in Mathematics Education, 12***(1), 65–69.

Count-Bys for Multiplication
(McIntyre, Test, Cooke, and Beattie, 1991)

Essential Learnings
1.1.4 Add, subtract, multiply, and divide whole numbers.
1.1.5 Use mental arithmetic, pencil and paper, or calculator as appropriate to the task involving whole numbers.

Background and Research Question
Susan B. McIntyre, David W. Test, Nancy L. Cooke, and John Beattie investigated the effects of count-bys on the acquisition, maintenance, and generalization of the fluency of single-digit multiplication facts with students with learning disabilities. Results indicated substantial increases in correct rate per minute. Rates maintained and generalized to other situations when count-by practice was stopped.

Translating Research Into Practice
1. Review the basic concept of multiplication through repeated addition (i.e., adding equivalent sets).

2. Review any previously taught count-by series and assess students until they can say the series at a mastery rate of one count per second.

3. Teach each new count-by series using a model-lead-test procedure to introduce the first half of the series until students can say it at a rate of one count per second. Then use the same procedure to introduce the last half of the series.

4. Have students practice the full series to fluency (i.e., within ten seconds).

5. When students have achieved fluency, have them practice writing the series several times.

6. Model the strategy to solve an example fact and have students imitate the procedure. Repeat this process with several problems on the chalkboard, providing corrective feedback and praise.

7. Have the student use the strategy orally with a worksheet containing several problems from the fact set.

8. Administer a daily probe and graph results with students so they can observe their progress.

Source
McIntyre, S.B., Test, D.W., Cooke, N.L., and Beattie, J. (1991). Using county-bys to increase multiplication facts fluency. ***Learning Disability Quarterly, 14,*** 82–87.

Multiplication Strategy
(Lloyd, Saltzman, and Kauffman, 1981)

Essential Learnings
1.1.4 Add, subtract, multiply, and divide whole numbers.
1.1.5 Use mental arithmetic, pencil and paper, or calculator as appropriate to the task involving whole numbers.

Background and Research Question
John Lloyd, Nancy J. Saltzman, and James M. Kauffman evaluated the effectiveness of preskills and strategy training on the acquisition of basic multiplication. Four male students (8–9 years old) with learning disabilities served as subjects. As part of preskills training, the students were taught to perform rote counting sequences for six numbers in this order: 5s, 7s, 2s, 10s, 3s, and 4s.

When students demonstrated mastery of the counting sequences, they were taught the following four steps: (1) point to a number you can count, (2) make hash marks for the other number, (3) count by the number you pointed to once for each hash mark, and (4) write in the answer space the last number you said. The students who were taught preskills alone were not able to perform multiplication tasks correctly. When the students were taught the strategy, they were able to solve the problems.

Translating Research Into Practice
1. Teach students the following strategy after they have demonstrated preskills mastery of counting sequences.

Multiplication Strategy

- Read the problem.
- Point to the number you know how to count by.
- Make the number of marks indicated by the other number.
- Begin counting by the number you know how to count by and count up once for each mark, touching that mark.
- Stop counting when you've reached the last mark
- Write the last number you said in the answer space.

2. Model the entire strategy while working out a multiplication problem on a small chalkboard.

3. Direct one student to say the steps of the strategy aloud as he/she solves another problem written on the chalkboard.

4. Write additional problems on the chalkboard and ask the student to solve them.

5. Allow the student's verbalization of the strategy to fade.

6. When the student has completed eight problems, give her or him a worksheet with seven additional problems.

Source
Lloyd, J., Saltzman, N.J., and Kauffman, J.M. (1981). Predictable generalization in academic learning as a result of preskills and strategy training. ***Learning Disability Quarterly, 4***(2), 203–216.

Demonstration Plus Permanent Model Technique for Long Division
(Rivera and Smith, 1988)

Essential Learnings
1.1.4 Add, subtract, multiply, and divide whole numbers.
1.1.5 Use mental arithmetic, pencil and paper, or calculator as appropriate to the task involving whole numbers.

Background and Research Question
Diane Rivera and Deborah Deutsch Smith studied the effectiveness of a modeling technique on the acquisition of long division with eight middle school students with learning disabilities. The modeling technique consisted of demonstration, imitation, and key words. The strategy was proven to be effective with all eight students.

Translating Research Into Practice
The Demonstration Plus Permanent Model is a technique that has proven successful for teaching addition, subtraction, multiplication, and division problems, including regrouping and no regrouping. The technique can be taught individually or in groups.

1. Provide students with a fact table for multiplication/division. Explain how to use the table and how it will both help reduce fact errors when completing problems and promote student independence.

2. Demonstrate the computational process by completing a problem while verbalizing key words for the steps used. For example, when solving a problem such as 1,240 divided by 5, the teacher might say:

   - Does 5 go into 1? Does 5 go into 12?
   - Place dot. How many numbers are in the answer?
   - Divide. How many times does 5 go into 12?
   - Multiply.
   - Subtract.
   - Check. Is the subtraction answer smaller than division?
   - Yes, continue. No, check work.
   - Bring down (student brings down next number).
   - Repeat.
   - Put up remainder, even if zero.

3. Ask the students to imitate the computational steps while repeating the key words orally. The student imitates the modeled process for the teacher, verbalizing the key words of each step just as the teacher did. If the student is unable to complete the imitate process correctly, the teacher repeats the demonstration, and the student attempts to imitate the process with a new problem.

4. Keep the demonstrated problem on the students' papers or the chalkboard for easy reference. The students refer to the model while completing the problems on the worksheet.

5. Monitor student completion of problems. If students make a fact error in their computation, tell them to check their work. If students have difficulty with the division process, ask the following questions: (1) What is the problem? (2) What are the steps? (3) What did you do? and (4) What do you do next?

Source

Rivera, D. and Smith, D.D. (1988). Using a demonstration strategy to teach midschool students with learning disabilities how to compute long division. ***Journal of Learning Disabilities, 21***, 77–81.

Self-Instruction Strategy for Mathematical Computation
(Leon and Pepe, 1983)

Essential Learnings
1.1.4 Add, subtract, multiply, and divide whole numbers.
1.1.5 Use mental arithmetic, pencil and paper, or calculator as appropriate to the task involving whole numbers.

Background and Research Question
James A. Leon and Henry J. Pepe conducted a study to assess the effectiveness of a self-instruction training procedure for remediating deficits in arithmetic computation. The self-instructional model included modeling, self-administration of reinforcement, feedback, coping instructions, and self-instructional dialog. Seventeen students with mild disabilities (9–12 years old) who participated in a self-instruction (cognitive behavior modification) group scored better than a control group on the operations area of the KeyMath Diagnostic Test. Systematic instructional variables (such as precise assessment and task-analyzed curriculum) were shown to be important.

Translating Research Into Practice
1. **Modeling.** Demonstrate how to compute the problem by talking aloud the process so students know what they should say to themselves and what questions they should ask to keep them focused on the process. For example: “First I read the numbers out loud and estimate how much it will be. Let’s see—75 plus 33 is going to be more than 100, but not much more. Now I start on the right and add the ones column. Now I add the tens column.”

2. **Coparticipation.** Have the student compute the problem together with you saying the steps aloud. Provide prompts and guidance when the student has difficulty working though the verbalization alone.

3. **Student demonstration.** Have the student compute the problem alone while talking aloud. Monitor the activity carefully giving immediate correction and feedback.

4. **Fade overt self-instruction.** Have the student demonstrate the computation with internal self-instruction.

5. **Feedback.** Compute the problem independently with internal self-verbalization and providing self-reinforcement for a job well done.

Source
Leon, J.A. and Pepe, H.J. (1983). Self-instructional training: Cognitive behavior modification for remediating arithmetic deficits. ***Exceptional Children,*** 54–60.

Using Math Manipulatives for Problem Solving
(Marsh and Cooke, 1996)

Essential Learnings
2.1 Investigate situations.
2.2 Formulate questions and define the problem.
2.3 Construct solutions.

Background and Research Question
Lynn G. Marsh and Nancy L. Cooke conducted a study to examine the effects of using manipulatives in teaching students with learning disabilities to identify the correct operation to use when solving math word problems. Three third grade students with learning disabilities participated in the study. All three students were accurate with basic computation skills but had difficulty representing word problems in mathematical equations. Students received 20 minutes of instruction each day in two phases. During the baseline phase, students received instruction in analyzing word problems without manipulatives. During the intervention phase, students were taught to use Cuisenaire rods to decide which operation to use in solving word problems. All students showed an immediate and sustained improvement in problem solving accuracy after being taught to used Cuisenaire rods to set up word problems. Improvements were also generalized to word problems when no manipulatives were available.

Translating Research Into Practice
The strategy includes general procedures, instruction on manipulatives, and administration of probes. The general procedures includes the following steps:

1. Preteach the **SOLVE** (Szubinski and Enright, 1989) strategy using the chart below:

SOLVE
S tudy the problem.
O rganize the facts.
L ine up a plan.
V erify your plan with computation.
E xamine your answer.

2. Have students read a word problem aloud. Help with unknown words if necessary.

3. Restate each part of the problem, and discuss its importance or nonimportance in finding a solution. Ask questions such as “What are we trying to find?” “Is there any information here that is not needed?” and “Where should we place this number?”

4. Guide students in the arrangement of numbers and thinking how to solve the problem by asking questions such as, “What do I need to do with the numbers now that they are arranged?”

5. Provide students with a set of four cards with the symbol for addition, subtraction, multiplication, and division printed on each card. Ask students to select one of the four operation cards. If the students are correct, have them record their work on paper. If the students are not correct, ask students to explain why they chose the operation they did and return to previous steps to reorganize a plan to solve the problem.

The manipulatives instruction includes the following steps:

1. State the objective of the lesson: “Today we are going to use Cuisenaire rods to help us decide how to go about solving word problems. We should be able to choose the correct process by first setting up our problem with the rods.”

2. Review Cuisenaire rod terms by asking questions such as “What does the term ‘set’ mean?” Show me two sets of 5.” “What does the orange rod represent?”

3. Have students read a word problem aloud. Define for students any word they may not understand.

4. Reread each part of the problem and have students use the rods to set up numerical values represented in the problem. Have students set up the problem as they read the problem by actually touching the rods and counting them.

5. Have students use the four operation cards to show the operation they used to solve the problem.

6. If students are correct, have them write the problem on paper. Since the focus is setting up the problem, it is not necessary to have the students actually solve the problem.

7. If students are incorrect, repeat steps 4 and 5.

After each session, assess students with ten word problems that include items involving different operations. Give the following directions: “Read through the problems, decide what process is needed to solve each problem, and record the symbol for the process under the problem. You do not need to write the numerals involved in solving the problem, and it will not be counted against you if you do not include the numerals.”

Source

Marsh, L.G. and Cooke, N.L. (1996). The effects of using manipulatives in teaching math problem solving to students with learning disabilities. ***Learning Disabilities Research and Practice, 11***(1), 58–65.

Self-Regulated Strategy for Mathematical Problem Solving
(Case, Harris, and Graham, 1992)

Essential Learnings
2.1 Investigate situations.
2.2 Formulate questions and define the problem.
2.3 Construct solutions.

Background and Research Question
Four fifth and sixth grade students with learning disabilities were taught a strategy for comprehending word problems and devising appropriate solutions. Prior to the study, the students commonly made errors on word problems because they executed the wrong operation (e.g., added when subtraction was required), not because they committed computational errors (did the right operation, but obtained the wrong answer). The strategy that the students were taught was responsive to their particular difficulties and was taught using self-regulated strategy procedures. Following instruction, performance on mixed sets of addition and subtraction word problems improved. Although generalization to a different setting occurred, maintenance was mixed.

Translating Research Into Practice
Preteaching. Help students to identify and learn the meaning of important cue words commonly found in word problems. When concentrating on addition, ask students to think of words indicating that numbers should be added. Present vocabulary cards containing a specific cue word or phrase (e.g., “have all together”) indicating what an addition word problem required along with an example of a word problem that contains the word or phrase. Demonstrate the use of the cue word or phrase with manipulatives. Have students define the word or phrases. Keep a list of these cue words in a folder. Have students practice identifying the cue words or phrases in word problems until they can correctly identify the cue words or phrases in two of every three problems.

Preassessment. Obtain a baseline of problem solving performance by administering a probe containing addition and subtraction word problems. Have students respond to each item by writing an answer along with the equation used to obtain the answer.

Review current performance level. Discuss with each student his or her performance on the probe. Present results using a bar graph. Discuss with the student what the goal of instruction will be, why this is important, and how learning the strategy will help the student achieve the goal. Ask the student to make a commitment to learn to use the strategy.

Describe the problem solving strategy. Use the chart on the next page to introduce the strategy. Discuss why and how each step is used in solving word problems. Emphasize the importance of what we say to ourselves as we work and use the strategy. Have students identify things they can say to themselves to help them find cue words or phrases in word problems.

Strategy Steps

1. Read the problem out loud.
2. Look for important words and circle them.
3. Write down the math sentence.
4. Draw pictures to help tell what is happening.
5. Write down the answer.

Model the use of the strategy and self-instructions by "thinking out loud." Have students refer to the chart containing the strategy steps while you model the strategy. Use self-instruction statements to guide and direct behavior: (1) problem definition (e.g., "What is it I have to do?"), (2) planning (e.g., "How can I solve this problem? . . . by looking for important words."), (3) strategy use (e.g., "The five-step strategy will help me look for important words."), (4) self-evaluation (e.g., How am I doing? Does this make sense?"), and (5) self-reinforcement (e.g., "I did a nice job; I got it right.").

Following the modeling, have the students identify what you said to yourself to do "good work" and use the strategy. Have students write in their folder other examples of things to say to oneself. Make sure at least one statement in each of the five categories is included. Stress that self-statements do not always have to be said aloud. Tell students that once they have learned them, self-statements can be thought in their head or whispered.

Mastery of strategy steps. Have students rehearse the steps of the strategy until the steps are memorized. Permit students to paraphrase the steps as long as meaning remains intact.

Guided practice. Have students solve sets of word problems containing seven items as a whole-group activity while you direct and monitor the process. Have students refer to the strategy chart and the student-generated self-instruction list as prompts. Withdraw these supports when they are no longer needed by the students. With the students, record the number of items answered correctly on the bar graph introduced during the initial conference. Once the students meet the criterion of six out of seven items correct, have them practice the strategy independently.

Independent practice. Have students use the strategy and self-instructions to solve word problems independently. With the students, record the number of items answered correctly on the bar graph introduced during the initial conference. Once the students meet the criterion of six out of seven items correct, have them practice the strategy independently.

Source

Case, L.P., Harris, H.R., and Graham, S. (1992). Improving the mathematical problem-solving of students with learning disabilities: Self-regulated strategy development. ***Journal of Special Education, 26***(1), 1–19.

Student-Produced Mathematics Problems
(Parmar and Cawley, 1991)

Essential Learnings
2.1 Investigate situations.
2.2 Formulate questions and define the problem.
2.3 Construct solutions.

Background and Research Question
Rene S. Parmar and John F. Cawley gathered data to determine whether (1) students with mild disabilities were capable of independent production of items similar to a given model, (2) what percentage of the items created by students were answered correctly, (3) to what degree students simply repeated items on a page, and (4) what differences were evident between the performances of students with mild disabilities and normally achieving students. The study included 119 normally achieving students and 83 students with mild disabilities in Grades 3 through 6. Students with mild disabilities understood item characteristics enough to create like items, though averaging three years behind normal achievers.

Translating Research Into Practice
1. Select a type of problem that the students are familiar with and can solve without much difficulty.

2. Prepare a worksheet with two examples of that type of problem.

3. Model how to solve the problems to make sure students know how to solve them.

4. Have students write as many problems of that type as they can in one minute. Explain that students are to create different problems of that type, not just repeat problems that were solved earlier in the activity.

5. Have students solve the problems they created.

Source
Parmar, R.S. and Cawley, J.F. (1991). Challenging the routines and passivity that characterize arithmetic instruction for children with mild handicaps. ***Remedial and Special Education, 12***(5), 23–32, 43.

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Guidelines for Adapting Materials for Students With Disabilities
(Archer, 1977)

Rating Scale:
1 = Inadequate 2 = Adequate 3 = Excellent M = Easily Modified

Effectiveness of Materials: 1 2 3 M

Yes No Is information that indicates successful fieldtesting or class testing of the material provided?
Yes No Has the material been successfully fieldtested with students similar to the target population?
Yes No Are testimonials and publisher claims clearly differentiated from research findings?

Prerequisite Skills: 1 2 3 M

Yes No Are the prerequisite student skills and abilities needed to work with ease in the material specified?
Yes No Are the prerequisite student skills and abilities compatible with the objectives of the material?
Yes No Are the prerequisite student skills and abilities compatible with the target population?

Content: 1 2 3 M

Yes No Does the selection of subject matter, facts, and skills adequately represent the content area?
Yes No Is the content consistent with the stated objectives?
Yes No Is the information presented in the material accurate?
Yes No Is the information presented in the material current?
Yes No Are various points of view, including treatment of cultural diversity, individuals with disabilities, ideologies, social values, gender roles, and socioeconomic status, represented objectively?
Yes No Are the content and the topic of the material relevant to the needs of students with disabilities?

Sequence of Instruction: 1 2 3 M

Yes No Are the scope and sequence of the material clearly specified?
Yes No Are facts, concepts, and skills ordered logically?
Yes No Does the sequence of instruction proceed from simple to complex?
Yes No Does the sequence proceed in small, easily attainable steps?

Standards: 1 2 3 M

Yes No Does the selection of subject matter, facts, and skills adequately represent the content area?
Yes No Is the content consistent with the stated objectives?
Yes No Is the information presented in the material accurate?

Initial Assessment and Placement: 1 2 3 M

Yes No Does the material provide a method to determine initial student placement in the curriculum?
Yes No Does the initial assessment for placement contain enough items to place the learner accurately?

Ongoing Assessment and Placement: 1 2 3 M

Yes No Does the material provide evaluation procedures for measuring progress and mastery of standards?
Yes No Are there enough evaluative items to measure learner progress accurately?
Yes No Are procedures and/or materials for ongoing record keeping provided?

Teaching Procedures: 1 2 3 M

Yes No Are instructional procedures for each lesson either clearly specified or self-evident?
Yes No Does the instruction provide for active student involvement and responses?
Yes No Are a variety of cueing and prompting techniques used to gain correct student responses?
Yes No When using verbal instruction, does the instruction proceed clearly and logically?
Yes No Does the material use teacher modeling and demonstration when appropriate to the skills being taught?
Yes No Does the material specify correction and feedback procedures for use during instruction?

Practice and Review: 1 2 3 M

Yes No Does the material contain appropriate practice activities that contribute to mastery of the skills and concepts?
Yes No Do practice activities relate directly to the desired outcome standard?
Yes No Does the material provide enough practice for students with learning problems?
Yes No Are skills systematically and cumulatively reviewed throughout the curriculum?

Archer, A. (1977). ***Instructional materials for the mildly handicapped: Selection, utilization, and modification***. Eugene, OR: Northwest Learning Resources System, University of Oregon. Permission to reproduce granted by author.

Bloom's (1956) Taxonomy of Educational Objectives: Cognitive Domain

Level of Objective	Task	Examples
Knowledge—Remembering information in about the same form as it was presented; recognizing and recalling vocabulary and details on a literal level. Previously memorized facts, names, figures, places, ideas, and phenomena must be stated.	Define, describe, identify, label, list, match, name, outline, recall, reproduce, select, state.	Knows common terms. Knows specific facts. Knows methods and procedures. Knows basic concepts. Knows principles. Defines "main idea."
Comprehension—Being able to put answers in one's own words; translating information from one form to another to interpret and estimate future trends. The student is required to explain a directly stated main idea, to compare and contrast, or tell the sequence of events in a story.	Convert, defend, distinguish, estimate, explain, extend, generalize, give examples, infer, paraphrase, predict, rewrite, summarize.	Understands facts and principles. Interprets verbal material. Interprets charts and graphs. Translates verbal material to mathematical formulas. Estimates future consequences implied in data. Justifies methods and procedures. Identify the main idea of a story.
Application—Using learned material in new and concrete situations; using rules and generalizing. Information learned previously must be used to arrive at a correct answer or action in a new situation.	Change, compute, demonstrate, discover, manipulate, modify, operate, predict, prepare, produce, relate, show, solve, use.	Applies concepts and principles to new situations. Applies laws and theories to practice situations. Solves mathematical problems. Constructs charts and graphs. Demonstrates correct usage of a method or a procedure. Identifies the main idea of a newspaper article.
Analysis—Breaking information into parts to understand its structure. One might be asked to identify someone's motive for an action, to draw a conclusion, or to provide evidence for a prediction about what will happen next in a story.	Break down, diagram, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, point out, relate, select, separate, subdivide.	Recognizes unstated assumptions. Recognizes logical fallacies in reasoning. Distinguishes between facts and inferences. Evaluate the relevancy of data. Analyzes the organizational structure of a work (art, music, writing). Gives ways to find the main idea in stories.
Synthesis—Putting elements together into a whole. Students must put together elements and parts to form a new whole that did not exist before.	Categorize, combine, compile, compose, create, devise, design, explain, generate, invent, modify, organize, plan, rearrange, reconstruct, relate, reorganize, revise, rewrite, summarize, tell, write.	Writes well-organized theme. Gives a well-organized speech. Writes a creative short story (poem, music). Proposes a plan for an experiment. Integrates learning from different areas in a plan for solving a problem. Formulates a new scheme for classifying objects (events or ideas). Writes a new story based on the main idea of a story you've read.
Evaluation—Judging against a criterion.	Appraise, compare, conclude, contrast, criticize, describe, discriminate, explain, justify, interpret, restate, summarize, support.	Judges the logical consistency of written material. Judges the accuracy with which conclusions are supported by data. Judges the values of a word (art, music, writing) by use of internal criteria. Judges the value of a work (art, music, writing) by use of external standards of excellence. Judges the author's effectiveness in presenting the main idea of a story.

I-C-U-E Planning and Evaluation Form

Identify student needs for adaptation:
Choose a **C-A-R-E-S** adaptation strategy:

Intervention Level	Adaptation Strategies	Change Date	Evaluation
Accommodations			
1. **C**hange the learning environment.	· Change physical environment (e.g., classroom and schedule). · Change socio-emotional climate.		
2. **A**lter instructional materials and activities.	· Clarify directions. · Scaffold instruction.		
3. **R**evise teaching strategies.	· Provide additional presentations. · Make consequences more attractive. · Increase practice opportunities.		
Modifications			
4. **E**xchange task requirements.	· Change conditions. · Change presentation mode. · Change response mode. · Change quantity criteria. · Change rate criteria. · Change accuracy criteria.		
5. **S**elect an alternate task.	· Select a prerequisite task. · Select a task from a different domain.		

Use the adaptation strategy with the student.
Evaluate the effectiveness of the adaptation strategy.

Accommodations Checklist for All Students

Scheduling Timeline	**WASL**	**ITBS**
· Administer the assessment over the entire testing window.	Yes	Yes
· Adjust materials to attention span.	Yes	No
· Provide frequent breaks.	Yes	Yes
· Allow students to continue working on each subtest as long as they are productively engaged. Time for individual students will vary considerably on a performance assessment.	Yes	No
· Administer the assessment at a time of day most beneficial to students.	Yes	Yes
Settings	**WASL**	**ITBS**
· Allow students to use study carrels or other private space.	Yes	Yes
· Use preferential seating (e.g., near the test administrator to see or hear directions better).	Yes	Yes
· Assess students individually or in a small group to reduce distractions.	Yes	Yes
· Assess students in a familiar school environment that maximizes high performance.	Yes	Yes
· Provide special lighting, furniture, or acoustics.	Yes	Yes
· Allow low level of calming music or nature sounds to reduce distractions.	Yes	Yes
· •Allow freedom for students to move or stand as needed.	Yes	Yes
Aids or Assistance	**WASL**	**ITBS**
· Use student's first (primary) language or signing (including ASL) to give assessment directions ONLY.	Yes	Yes
· Reread directions or quietly repeat for individuals.	Yes	Yes
· Clarify language on directions only.	Yes	No
· Have students reread directions.	Yes	Yes
· Assist the students in tracking the assessment items by pointing or placing a finger on them. Allow the test administrator or another familiar adult to sit beside students.	Yes	Yes
· Encourage students to sustain effort and remain on task.	Yes	Yes
· Provide physical assistance in turning pages, handling materials, etc.	Yes	Yes
· Secure papers and materials to work area with tape or magnets,	Yes	Yes
· Provide pencils adapted in size or grip.	Yes	Yes
· Underline or mark their booklets with a pencil. Students may NOT use a highlighter on the test booklet (it bleeds through to the other side and may make scanning difficult).	Yes	Yes
· During both days of writing, students are permitted to use published materials such as a dictionary and a thesaurus in print or electronic form (but no spell check).	Yes	Not Applicable
· Tape record directions for use with small groups or individuals.	Yes	Yes
Format	**WASL**	**ITBS**
· Use the space available. If students cannot write within available space, their work must be transcribed VERBATIM into the test booklet. Added pages will not be scored.	Yes	Not Applicable

Accommodations Checklist for Special Populations

Scheduling Timeline	**WASL**	**ITBS**
· Administer the assessment over the entire testing window.	Yes	Yes
· Adjust materials to attention span.	Yes	No
· Provide frequent breaks.	Yes	Yes
· Allow students to continue working on each subtest as long as they are productively engaged. Time for individual students will vary considerably on a performance assessment.	Yes	No
· Administer the assessment at a time of day most beneficial to students.	Yes	Yes
Settings	**WASL**	**ITBS**
· Provide architecturally accessible testing sites.	Yes	Yes
· Assess students in a hospital or institution; home bound students in their home (with appropriate test security procedures).	Yes	Yes
· Allow students to use study carrels or other private space.	Yes	Yes
· Use preferential seating (e.g., near the test administrator to see or hear directions better).	Yes	Yes
· Assess students individually or in a small group to reduce distractions.	Yes	Yes
· Assess students in a familiar school environment that maximizes high performance.	Yes	Yes
· Provide special lighting, furniture, or acoustics.	Yes	Yes
· Allow low level of calming music or nature sounds to reduce distractions.	Yes	Yes
· Allow freedom for students to move or stand as needed.	Yes	Yes
Aids or Assistance	**WASL**	**ITBS**
ESL		
If an ESL student falls within a "limited English speaker range" (based on a state-approved language proficiency test), allow student to:		
· Use a reader to read math assessment items VERBATIM in English.	Yes	No
· Provide published English, native language, or visual dictionaries only on the writing test. Only published thesaurus or dictionary in print or electronic form may be used (no student-created dictionaries).	Yes	Not Applicable
IEP or 504		
If the student's IEP or Section 504 plan documents a disability that affects reading or written communication, allow the student to:		
· Answer orally, point, use voice recognition technology, or sign in (SEE or ASL) an answer. A scribe records the student's response VERBATIM (e.g., from written dictation or audio tape) without interpretations, translation, or corrections. If a scribe is used, the scribe should write down the student's answer VERBATIM without punctuation or capital letters and then the scribe should ask the student to edit the text (directing the scribe to add punctuation and capital letters).	Yes	Yes
· Use appropriate physical supports or assists (e.g., easel, magnifier, arm or stabilizer guide, text-talk converter, communication device to indicate responses, noise buffers, FM or other sound amplification device to assist in hearing directions, slantboard or wedge).	Yes	Yes
· Use a reader to read math assessment items VERBATIM in English, or use SEE sign or ASL.	Yes	No
· Use computer or word processor for recording responses (no spell check or student-created dictionaries) when a computer is indicated on the IEP or Section 504 plan for written communication. Student responses must be transcribed verbatim into the test booklet. Added pages will not be scored.	Yes	Not Applicable
· Isolate portions of the assessment page to focus student's attention (mask).	Yes	Yes
· Use math manipulatives (except calculators) as indicated. Use calculators only as specifically permitted in test directions.	Yes	Yes
Format	**WASL**	**ITBS**
· Allow Braille or large-type editions for the assessment, with appropriate test security measures for all students who use large print.	Yes	Yes