Assessment Overview

A guide to the Addition & Subtraction and Multiplication & Division Assessments

Schema-Based Instruction · **Intervention-Ready** · **Progress Monitoring**

2024

ADDITION & SUBTRACTION

Level 1A Numbers to 10
Level 1B Numbers to 20
Level 2A Numbers to 100
Level 2B Numbers to 1,000

Grades K–5 · 12 problems per level

MULTIPLICATION & DIVISION

Basic Facts Single-digit numbers
2-Digit Expanded computation
3-Digit Multi-digit mastery

Grades 3–5 · 12 problems per level

Purpose and Design

The Word Problem Intervention Program (WPIP) includes two diagnostic assessments designed to help educators identify exactly where students struggle with word problems — and why. Rather than measuring general computation skill, these tools assess students' ability to recognize and apply mathematical problem structures across a range of number ranges and operation types.

Each assessment is built around schema-based instruction, a research-supported approach in which students learn to identify the underlying structure of a word problem before solving it. By categorizing student errors by problem type — not just by whether the answer was correct — teachers gain targeted, intervention-ready data that goes far beyond a single score.

Assessment 1: Addition & Subtraction

The Addition & Subtraction Assessment measures student understanding of additive word problem structures across four leveled versions, allowing teachers to select the appropriate starting point for each student.

Number Range Levels

Level 1A — Numbers to 10
Designed for early kindergarten and first grade intervention; uses single-digit numbers throughout.

Level 1B — Numbers to 20
Appropriate for late first and second grade; introduces teen numbers and two-digit reasoning.

Level 2A — Numbers to 100
Targets second and third grade; requires two-digit computation within the same problem structure framework.

Level 2B — Numbers to 1,000
Designed for grades three through five; three-digit numbers reveal whether structural understanding holds at higher number ranges.

Problem Types Assessed

Across all four levels, the same 12-problem structure is used. Each problem type appears twice, giving a more reliable picture of student understanding:

- Result Unknown / Whole Unknown (#1, #2) — Students find a total or end result when all parts are known.
- Change Unknown / Part Unknown (#3, #4) — A part of the situation is missing; students must determine what changed or what one part equals.

- Start Unknown (#5, #6) — The starting quantity is unknown; students work backward from a result.
- Difference Unknown (#7, #8) — Students compare two quantities and find how much more or less one is than the other.
- Larger Quantity Unknown (#9, #10) — The larger of two compared quantities must be found using a known difference.
- Smaller Quantity Unknown (#11, #12) — Students determine the lesser quantity in a comparison situation.

The progression from Result Unknown through Smaller Quantity Unknown reflects the research-based continuum of additive problem difficulty, with Start Unknown and Compare problems representing the greatest challenge for most students.

What the Score Recording Sheet Reveals

The A&S Score Recording Sheet organizes results by problem type rather than by problem number. A student scoring 2/2 on Result Unknown but 0/2 on Start Unknown tells the teacher far more than a total score of 10/12 alone — it pinpoints the specific schema and position (start, change, result) that requires instructional attention.

Assessment 2: Multiplication & Division

The Multiplication & Division Assessment is designed for grades 3–5 and follows the same 12-problem, schema-based format. Three leveled versions allow teachers to assess students at their current computation level without conflating structural understanding with arithmetic difficulty.

Number Range Levels

Basic Facts
Single-digit factors and dividends; assesses whether students recognize multiplicative structures before multi-digit computation is required.

2-Digit Numbers
Two-digit multipliers and dividends; appropriate for late third through fourth grade students.

3-Digit Numbers
Three-digit numbers across all problem types; confirms that structural understanding scales to larger numbers for fourth and fifth grade students.

Problem Types Assessed

The M&D Assessment covers four multiplicative problem structures, with the number of items per category reflecting their relative complexity and instructional importance:

- Equal Groups Structure (#1, #3, #4, #7, #9, #11) — Six problems assess students' ability to work with equal-groups situations: finding the total, the number of groups, and the size of each group. This is the foundational multiplicative structure.
- Rate Structure (#5, #10) — Two problems involve a constant rate applied over a quantity. Rate problems require students to recognize the multiplicative relationship between a unit rate and a multiplier.
- Comparison Structure (#8, #12) — Two problems assess multiplicative comparison, where one quantity is described as a multiple of another. These are among the most challenging for students transitioning from additive to multiplicative thinking.
- Addition / Subtraction Structure (#2, #6) — Two embedded additive problems allow the teacher to confirm that a student who struggles is actually confused by multiplicative structure, not by the operation of solving for an unknown.

The Embedded A&S Problems

A distinctive feature of the M&D Assessment is the inclusion of two addition and subtraction problems within the 12-item set. This is intentional. If a student performs well on the additive items but struggles with multiplicative ones, the teacher can be confident the difficulty is structural — the student understands how to solve for an unknown quantity, but does not yet recognize equal-groups, rate, or comparison situations as multiplicative. This diagnostic contrast is essential for planning targeted intervention.

Side-by-Side Comparison

The table below summarizes the key features of both assessments for quick reference:

Feature	A&S Assessment	M&D Assessment
Number of levels	4	3
Number ranges	To 10 / 20 / 100 / 1,000	Basic Facts / 2-Digit / 3-Digit
Problems per level	12	12
Total score	12 points	12 points
Target grades	K–5	Grades 3–5
Problem types assessed	6 types (2 each)	4 types (varying)
Includes A&S problems?	Yes — all 12	Yes — 2 embedded

Shared Design Features

Both assessments share a consistent set of design principles that reflect the instructional philosophy of the Word Problem Intervention Program:

- Read-aloud administration — Each assessment directs teachers to read problems aloud before students solve independently, ensuring that decoding ability does not interfere with math reasoning.
- Schema-aligned scoring — The Score Recording Sheet groups problems by type, not by number, making it immediately clear which structures need intervention.
- Progress monitoring ready — Because each level uses identical problem structures with only the numbers changed, both assessments can be re-administered after instruction to track growth on the exact same skills.
- Leveled by number range, not by problem complexity — The same problem types appear at every level, allowing teachers to isolate whether difficulty is structural or computational.
- 12-problem format — Both assessments use a consistent 12-problem layout, making them quick to administer and easy to score within a single session.

Recommended Use

These assessments are designed to be used at three points in the intervention cycle:

- **Initial Placement — Administer the appropriate level based on a student's current grade and number sense to identify which problem structures require instruction.**
- **Progress Monitoring — Re-administer the same level after completing a unit of instruction to measure growth on targeted problem types.**
- **Level Advancement — When a student demonstrates mastery at one level, administer the next level up to confirm that structural understanding transfers to larger number ranges.**

For best results, pair assessment data with the corresponding WPIP eLibrary books and schema materials. The assessment identifies which schemas need work; the program provides the structured instruction to address them.