

## Common Problems Experienced by Struggling Students

Students in need of remediation often exhibit similar problems. *Corrective Mathematics* provides the careful teaching and systematic practice that creates steady, measurable progress.

Learn more about five problems struggling students face and how *Corrective Mathematics* helps them overcome the difficulties that they have had with mathematics.

- €# Memorization of the basic number facts
- €# Standard algorithms
- €# Over reliance on estimation
- €# Mathematical reasoning and problem-solving competency
- €# Understanding of fractions

## Common Problem—Memorization of the Basic Number Facts

### Common Problem

#### *Memorization of the Basic Number Facts*

Memorizing the “basic number facts,” i.e., the sums and products of single-digit numbers and the equivalent subtraction and division facts, frees up working memory to master the arithmetic algorithms and tackle math applications. Research in cognitive psychology points to the value of automatic recall of the basic facts. Students who do not memorize the basic number facts will founder as more complex operations are required, and their progress will likely grind to a halt by the end of elementary school. There is no mathematical fluency without memorization of the most basic facts.

### How Corrective Mathematics Addresses It

Corrective mathematics promotes a high level of student proficiency by teaching each fact as a member of both a number family and a fact series, rather than separate entities to be memorized.

Number families consist of three numbers that go together to form a basic fact. In addition and subtraction, students work with number families that look like this:

$$4 + 1 = 5$$

$$1 + 4 = 5$$

$$5 - 1 = 4$$

$$5 - 4 = 1$$

Learning number families is instructionally economical because each number family translates into four facts.

Number family exercises present facts in order to show their relationship to counting. For example:

$$6 + 1 = 7$$

$$6 + 2 = 8$$

$$6 + 3 = 9$$

Every time a number is counted in the second addend (1, 2, 3), the number is counted in the sum (7, 8, 9). By teaching fact relationships, individual facts are easier to recall.

Once students have a number of firm reference points and know how to use these reference points to figure out closely related facts, the modules provide a number of exercises designed to increase proficiency and automaticity with individual facts, including individual facts in which groups of students compete, the individual facts in which individual students earn points, and individual facts for optional facts practice.

Number family relationships usually omitted in instructional programs are taught. For example, division facts are taught in most programs, but not division remainder facts. In

## Common Problem—The Standard Algorithms

### **Common Problem**

#### ***The Standard Algorithms***

The standard algorithms are powerful theorems and they are for a good reason: They are guaranteed to work for all problems of the type for which they were designed. Knowing the standard algorithms, in the sense of being able to use them, is a foundational skill for an elementary schools students. Students who master these algorithms gain confidence in their ability to compute. They know they can solve any addition, subtraction, multiplication, or division problem without relying on a mysterious black box, such

### **How Corrective Mathematics Addresses It**



## Common Problem—Mathematical Reasoning and Problem Solving Competency

### Common Problem

#### *Mathematical Reasoning and Problem-solving Competency*

Problem-solving is an indispensable part of learning mathematics. Children should be able to solve single-step word problems in the earliest grades and deal with increasingly more challenging, multi-step problems as they progress. Too often, programs fail to develop important prerequisites before introducing advanced topics.

### How Corrective Mathematics Addresses It

One of the major strengths of the *Corrective Mathematics* program is that *Corrective Mathematics* teaches a precise strategy for determining which mathematics operation is required by a given story problem—a feature not typically shared by other mathematics programs.

€# Although students learn in the \_\_\_\_\_ module that certain verbs generally indicate whether to add (find, get, buy) or subtract (lose, give away, break), they quickly learn that they cannot rely solely on the verb to determine the appropriate operation. For example, the following problem calls for addition, even though \_\_\_\_\_ would seemingly call for subtraction.

€# Because using the verb to determine whether addition or subtraction is called for is not a viable strategy for many story problems, the \_\_\_\_\_ module quickly teaches this discrimination strategy: If the problem gives the big number, it's a subtraction problem; if the problem does not

## Common Problem—Fraction Development

### Common Problem

#### *Fraction Development*

In general, too little attention is paid to the coherent development of fractions and there is not enough emphasis on paper-and-pencil calculations. When fraction arithmetic is poorly developed in the elementary grades, students have little hope of understanding algebra as anything other than a maze of complicated recipes to be memorized.

### How Corrective Mathematics Addresses It

The development of fractions and decimals receives special attention in \_\_\_\_\_ as students are guided through a logical, coherent progression of steps.

€# \_\_\_\_\_ teaches what the numbers in a fraction tell.

The bottom number tells how many parts in each whole, and the top number tells how many parts are used. In the fraction  $\frac{3}{4}$ , there are 4 parts in each whole and 3 parts are used.

€# Students learn the difference between parts of a whole and an entire whole. Later they learn to tell how many wholes a fraction equals by determining how many times bigger the top number is than the bottom number.

€# The module presents visual examples of what happens when fractions are added and worksheets provide a great deal of practice adding and subtracting fractions with like denominators.

Before students add and subtract fractions with unlike denominators, they learn to make the bottom numbers the same by figuring out the fraction versions of 1 by which they must multiply each original fraction.

€# Students learn that equivalent fractions are created by multiplying a fraction by another fraction that equals 1. Two components skills exercises prepare students for equivalent fraction exercises.

€# The first component skill teaches students to identify fractions that equal 1 whole: A fraction equals 1 whole when you use the same number of parts that are in each whole.

€# The second component skill teaches the concept that when you multiply by 1, you start and end with equal amounts.

€# The initial exercises in which students are asked to find a missing number in an equivalent fraction are written in this

form: \_\_\_\_\_ =

€# The students will write a fraction equal to 1 in the paren-