THE CMC DIFFERENCE
Research based
Field tested
Organization of Instruction
Interactive lessons
Consistent language of instruction
Assessment and remediation

Explicit instruction with students who have mathematical difficulties has shown consistently positive effects on performance with word problems and computation. By the term *explicit instruction*, the Panel means
-that teachers provide clear models for solving a problem type using an array of examples
-that students receive extensive practice in use of newly learned strategies and skills,
-that students are provided an opportunity to think aloud and that students are provided with extensive feedback.

ORGANIZATION OF INSTRUCTION

• Books organized into chapters, units or topics.
• Students next see the topic the following school year.
• What will your students remember after a year?

“A major goal for K-8 mathematics education should be proficiency with fractions, for such proficiency is foundational for algebra”
Students who fail Algebra 1 are 4.1 times more likely to dropout than those who pass the first time. (Orihuela, 2006)

Daily lessons in a currently popular math curriculum, Topic 12, 3rd grade instruction in fractions:
- Dividing regions into equal parts
- Fractions describe equal parts of a whole
- Fractions and sets
- Benchmark fractions
- Equivalent fractions
- Comparing fractions
- Fractions on a number line
- Adding fractions with like denominators
- Subtracting fractions with like denominators
- Topic test

TRACK SEQUENCING

Each instructional track focuses on one topic.
Exercises within a track change systematically.
- Early in the track, work is highly prompted and teacher directed.
- As student mastery increases, prompting is faded and students become independent.
Each lesson contains only 10-15% new information.
“Conceptual and procedural knowledge about fractions with magnitudes less than 1 do not necessarily transfer to fractions with magnitudes greater than 1.”

Grade 3- 3.NF1-Understand a fraction a/b as the quantity formed by a parts of size 1/b

“Fractions with magnitudes greater than 1”
Grade 3 - 3.NF2a-Understand a fraction as a number on a number line

- a. 
- b. 
- c. 

3 = 12/4 = 15/5 = 3/1 = \( \frac{27}{9} \)

c. \( \frac{3}{2} > \frac{7}{7} \)
Continuous Practice and Systematic Review

Traditional spiral curriculum
- Fractions taught in a 10 lesson “topic”
- Topic will next be seen at the next grade level

Track sequencing
- Fractions taught over a 90 lesson span
- Continuous practice, review and expansion
TRADITIONAL INSTRUCTION VS CONNECTING MATH CONCEPTS

<table>
<thead>
<tr>
<th>SPIRAL CURRICULUM</th>
<th>TRACK CURRICULUM</th>
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<tr>
<td>Brief coverage of topics</td>
<td>Gradual yet intensive coverage</td>
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<td>Discovery and vague explanations</td>
<td>Explicit strategies</td>
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<tr>
<td>Emphasis on rote procedures</td>
<td>Procedures clearly connected to key concepts</td>
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<td>Rapid transition to independent practice</td>
<td>Guided practice before independent</td>
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<tr>
<td>Limited practice and review</td>
<td>Extensive practice and cumulative review</td>
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INTERACTIVE LESSONS

Each lesson has 7-9 exercises
Teacher presents information
Students respond orally and in writing
Work is checked providing
• Immediate feedback
• Correction of errors
Lessons end with independent work

TESTING

Placement testing
In-program mastery tests
Cumulative tests
PLACEMENT TESTING

All placement tests in Series Guide

- Students new to CMC - give just Section 1 of levels D & F; administer all of level E.
- Students currently in CMC - give Section 2 of placement test of levels D & F for grouping purposes.
- Use caution in starting groups at lesson other than 1 at the beginning of the school year.

MATERIALS

Teacher Materials:
- Teacher Presentation Books
- Teacher Guide
- Math Fact Worksheets
- Board Display CD

Student Materials:
- Workbooks
- Textbook (Level C - E)
- Student Assessment Book

INSTRUCTIONAL MATERIALS

Online Resources through ConnectED

- Teacher Presentation ebooks
- Common Core Correlations
- Board Displays
- Student Practice Software
- Math Facts worksheets
- Online record keeping with 2Inform
PROVIDING CONCEPTUAL FRAMEWORKS
(GENERALIZABLE STRATEGIES)

• Teach **one way** to solve a problem type.
• Teach it to **mastery**.
• Expand it to a **full range** of variations and new problem types.
Number Families

2 + 3 = 5
3 + 2 = 5
5 - 3 = 2
5 - 2 = 3

These are number families.
- What are they? (Signal) Number families.
If you learn number families, you don’t have to count to figure out the answer to problems that plus or minus.
Remember: If you know the three numbers in a family, you don’t have to count to work plus or minus problems with those numbers.
Strategy for Word Problems

First: graphically represent the word problem

Then: determine how to write the number problem
Conceptual Tool
Easy to Use
Convenient
Visually Indicates the Operation
Simple to Complex Problems

Comparison Problems-Level C

6. (Display) 10 is more than 7.

- (Point) Here’s a sentence: 10 is more than 7.
- Say the sentence. (Signal) 10 is more than 7
- Which number is bigger? (Signal) 10.
- So I write 10 as the big number and 7 as the small number right next to 10.
- (Add to show)

7. (Display) 10 is more than 7.

8. (Display) 4 is less than 5.

- (Point) New sentence: 4 is less than 5.

35 is 20 more than J.

20 \underline{\hspace{1cm}} \rightarrow \underline{\hspace{1cm}} 35
• M is 63 less than V.
• M is 42.
• What number is V?

\[
\begin{array}{ccc}
\text{M} & 63 & 42 & \text{V} \\
\end{array}
\]

**COMPARISON VOCABULARY**

- car
  - 15 feet long
- boat

a. Fran is 4 years older than Jan.
b. The gray dog is 3 years younger than the white dog.
c. The boat is 1 year older than Tom.
In 1989, there were 582 dog owners and 621 cat owners. How many fewer dog owners were there than cat owners?
START/END

Donald started out with some money. He spent $2.36. He ended up with $8.14. How much money did he start with?

START/END

Jan had 40 more marbles than Sam had. Sam had 17 marbles. How many marbles did Jan have?
START/END
Tina started with 25 seashells. She found some more seashells. Now Tina has 47 seashells. How many seashells did she find?

25

47

WORKBOOK PRACTICE
a. Open your workbook to Lesson 65 and find part 1.
   (Teacher reference)

b. Touch box 1.
   The names in box 1 are grapes and cereal.
   • Tell me the name for the big number.
     (Signal) Food.
   • What's the letter for the big number? (Signal) F
   • You're going to put letters in the top row of families.
     • Touch the family with the letter F in the top row.
     • Put letters for grapes and cereal in that family.
     (Display) 85.05

INDEPENDENT WORK
Part 5: Work on each problem. Remember the unit name.

a. 58 children were in the zoo. 26 of the children were girls. How many boys were in the zoo?

 b. There were 60 vehicles in all. 60 vehicles were cars. 42 vehicles were trucks. How many vehicles were in the part?
MULTIPLICATION/DIVISION NUMBER FAMILY

There are 6 bottles in each case. There are 24 cases. How many bottles are there?
There are 6 bottles in each case. There are 24 bottles. How many cases are there?

Multiplication/Division Word Problems

There were 464 students. In every group, there were 9 students.
1. How many groups were there?
2. What fraction of a group was left over?
3. How many students were not in a full group?

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**LEVEL E-LESSON 42**

- Multiplication/division number families/facts
- Adding whole numbers and fractions
- Multiplication by 10’s numbers
- Working remainder problems
- Multiplication facts
- Fractions as division
- Word problems
- Division
- Decimals
TEACHING EFFECTIVELY

• Seat low performers in the front
• If students are at desks, allow for teacher “traffic patterns”
• Mark workbooks to find lessons easily

Detailed information in Teacher’s Guide
  Series Guide-page 14-24
  Level D- pages 14-27
  Level E- pages 16-31
  Level F- pages

BEFORE TEACHING A LESSON

Focus on new skills-
• Rehearse the script
• Be prepared to write on the board or use displays
• Anticipate errors and be ready to correct
  ★ Planning pages in Teacher Presentation indicate new skills

USING THE TEACHER SCRIPT

This blue type indicates what the teacher says.
(This black type indicates what the teacher does.)

This italic type shows the students’ response.

This bold blue type indicates what the teacher and students say together.

(This italic type indicates what the student do.)
TEACHING EFFECTIVELY

- Many exercises begin with oral practice.
- Written practice with teacher feedback follows.
  ✓ Check to be sure students followed directions.

TO MANAGE EFFECTIVELY-
Students write answers in pencil
Check and correct in pen
No Working ahead!
SIGNALS

- Unison group responses -
  - Keep all students actively involved
  - Enable the teacher to monitor understanding

- (Signal) indicates a group response
- A basic signal follows a question, a direction or the words “Get ready.”
- Signals may be audible or visual, depending on student focus.

CORRECTIONS

All corrections should be
- Immediate
- To the group
- Specific to the error
- Positive

REPEAT UNTIL FIRM

Firm means that all students in the group can complete the exercise without error.

Correct the error by
- Telling the correct answer
- Repeat the task
- Repeat the step
PACING THE LESSON

• (If students are 100% skip to Exercise 3.)
  • Box indicates parts to skip.

• Bracket indicates part to firm.
  • “Let’s do those again.”

ACTIVE MONITORING

“Observe children and give feedback” indicates that you have just given directions.
Do not give individuals additional instructions
Give positive feedback for starting work.
  • Whenever possible, reinforce the group
    • “I like the way everyone got started.”
    • Or “Good job getting started Marcus.”
      not “Come on Randy, get to work!”

ACTIVE MONITORING

Point out individual mistakes, but correct group errors.
  • “Lisa take another look at problem B.
  • “Everybody, pencils down. Let’s go over these again.”

Acknowledge pencils down.
  • “Keisha and Brett have pencils down. They are ready to check.”

Allow a reasonable time before checking.
  • “Checking in 10 seconds, finish up.”
WORK CHECK

Immediately follows guided practice
Students mark incorrect answers
• Answers written in pencil, check in pen
Students make corrections
• Corrections made in pen

BOARD DISPLAYS

(Display:) indicates that material in shaded blue box should be displayed.
Options-
• W Write on the board
• Use board display CD or ConnectEd

INDEPENDENT WORK

Last part of each lesson
Provide remediation if more than 30% of students miss more than one or two items on a part.
Students should be @ 85% mastery on all independent work.
INDEPENDENT WORK
Group work check is most effective way to check, or
Check/grade work
• For large groups, use colored dots.
• “If your book has a green dot, hand it in.”
Use independent work time for small group or individual remediation as needed.

LESSON PRACTICE
CMC E-Lesson 1- Analyzing the exercises
✓ What skill is being taught?
✓ Where is student attention focused?
✓ What kind of signal is used?
✓ What are the steps (letters)?
✓ Where do you firm?
✓ Are there individual turns?

SMALL GROUP LESSON PRACTICE
Choose the level that you anticipate teaching
Prepare to teach two exercises
    One where student attention is focused on their book
    One where attention is focused on a display
Analyze the exercises
Form groups of 4-5
Teach to your group!
Students must make mistakes!
TRACKS
In groups, examine an instructional track. Record:

- On what lesson the track begins and ends.
- The strategies and skills taught in the track.
- Teaching notes for the track.

IN-PROGRAM MASTERY TESTS
Occur every ten lessons
Focus on critical skills in preceding lessons
Located in Student Assessment Book
Mastery Test Summary Sheets located in Teacher's Guide or use 21Inform
Scoring information in Answer Key
Provide grade
Indicate where remediation is needed before the next lesson.

TEST REMEDIES
Remedies specified in the Answer Key.
Remedy worksheets located in the Student Assessment Book.
Provide a group remedy for each part that has a failure rate of more than 25%.
Remedies are most effective in small groups, focusing on students who failed a part.
Retest students on the parts that were missed.
CUMULATIVE TESTS
Occur halfway through the program and at the end.
Focus is on all previously taught skills.
Tests located in Teacher Presentation Book.
Tests may take more than one class period to administer.
Remedies and worksheets available on ConnectED.

SRA
2Inform
Online Data Management System