Bag of Tricks for Inclusion Teachers and Math Coaches to Promote CGI Techniques

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11 Years Teaching

FSU-STEM Study Participant

CGI Year 3

STEPS for Reaching & Teaching Small Groups

- Cognitively Guided Instruction, (CGI)
- Importance of Understanding Problems
- Understanding Student Strategies and the Progression
- Activity
- Keeping it Together
- Bringing "IT" to the Classroom in Small Groups

Cognitively Guided Instruction, CGI

Teaching with Understanding promotes Learning through Understanding

How it Works:

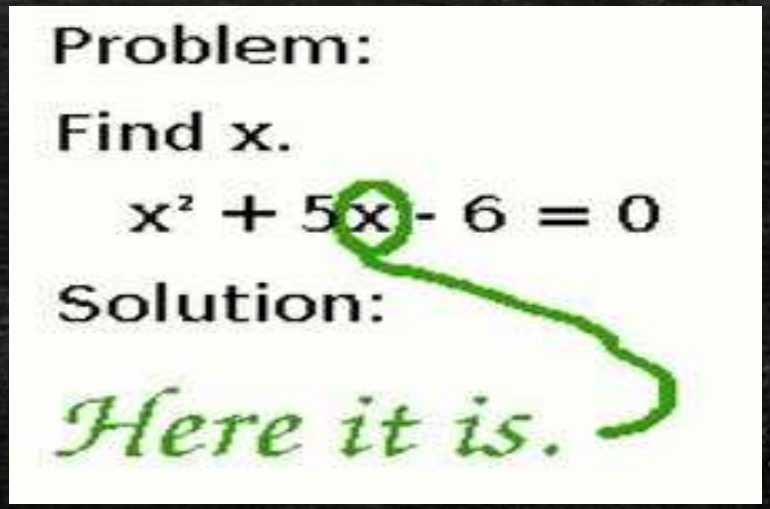
1. **Pose a Meaningful Problem**
   - Understand the context of problem/story. (Unpack)

2. **Strategically Select student Strategies**
   - Choose a variety including Direct Modeling, Counting, and Flexible Choice to share and discuss.

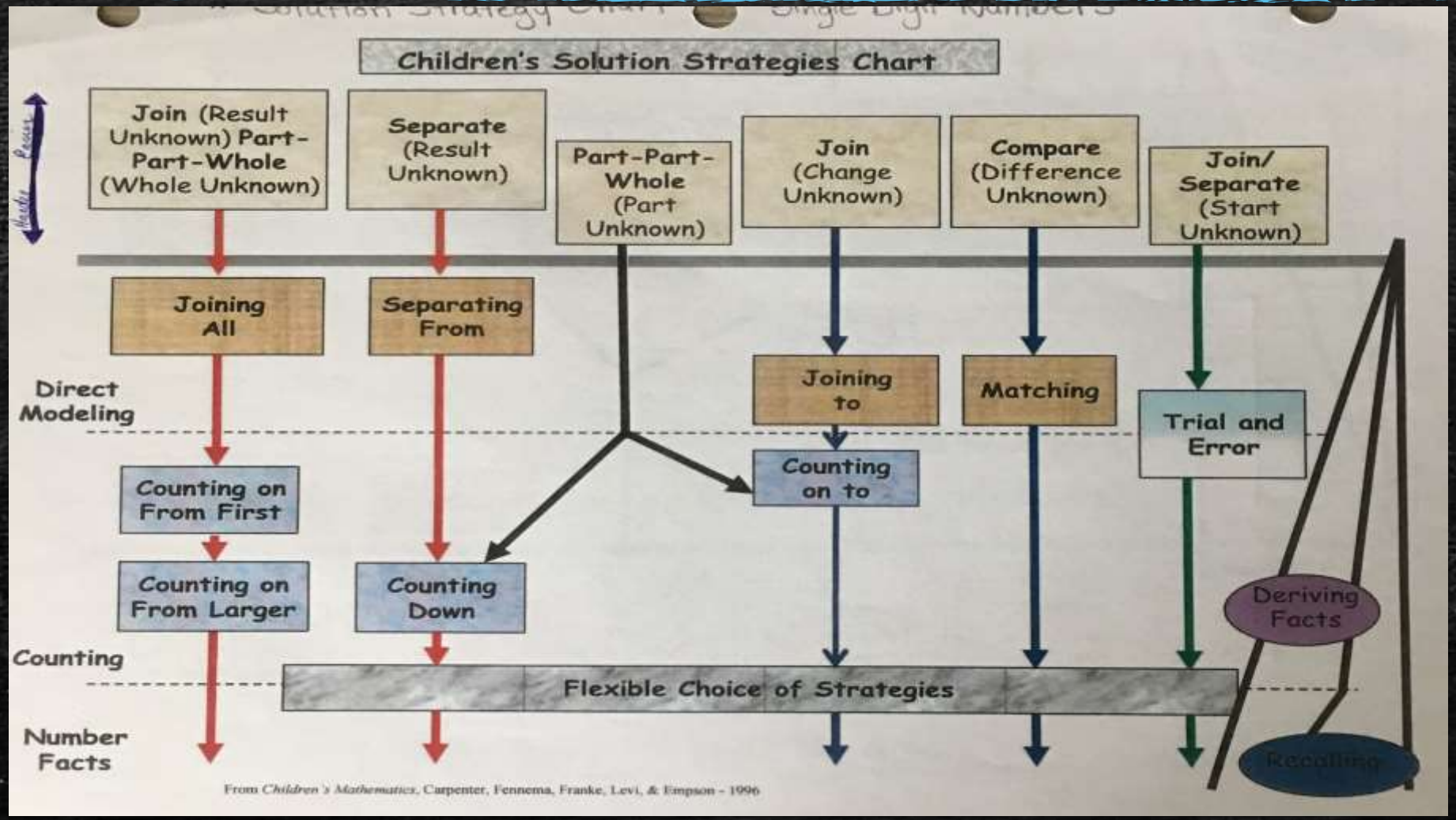
3. **Elicit Student Thinking**
   - Ask specific questions about their strategy and thinking.
   - Use correct, incorrect, and incomplete strategies.
   - DO NOT IMPOSE YOUR THOUGHTS OR IDEAS

Importance of Understanding Problems

Be sure students understand the problem. Be sure to make clarification of words or meanings before letting their minds do the work. ☺ Great time for teachable moments.



Strategies and Progression



Direct Modeling Strategies for Multiplication & Division

Direct Modeling Strategies for Multiplication and Division Problems

Problem	Strategy Description
Multiplication *Bart has 4 boxes of pencils. There are 6 pencils in each box. How many pencils does Bart have altogether?*	***Grouping*** Make 4 groups with 6 counters in each group. Count all the counters to find the answer.
Measurement Division *Bart has 24 pencils. They are packed 6 pencils to a box. How many boxes of pencils does he have?*	***Measurement*** Put 24 counters into groups with 6 counters in each group. Count the groups to find the answer.
Partitive Division *Bart has 6 boxes of pencils with the same number of pencils in each box. Altogether he has 24 pencils. How many pencils are in each box?*	***Partitive*** Divide 24 counters into 6 groups with the same number of counters in each group. Count the counters in one group to find the answer.

FIGURE 4.3

Student Strategies

How it Looks:

Direct Modeling:

- Manipulatives
- Illustrations/Models
- Fingers Representing BOTH Quantities

Counting:

- Manipulatives
- Fingers Representing Counts
- *Written Representation of Counting

Imperative to Allow Students to use their OWN Strategy!

Student Strategies

How it Looks:

Flexible Choice of Strategies:

- Strategies that don't follow structure of problem.
- Illustrations/Written

Long Term Goal: Number Facts

- Recall
- Display deepened knowledge through experiencing the progression of strategies as opposed to rote memorization.

Remember: Be a facilitator, not an advisor!

Activity

*Imagine you are a 1st, or 2nd Grade student.
*Draw, Write, or Explain how a student may solve this particular problem.
*Keep in mind **manipulatives** that may be used in the classroom.

Ashlee had ___ stickers in her sticker book. She receives ___ more stickers from her teacher. How many stickers does Ashlee have now?

(8, 4) (3,12) (15, 20)

Activity

1. Strategically Place Strategies in order from concrete to abstract.

2. Discuss the connections between strategies, look for teachable moments.

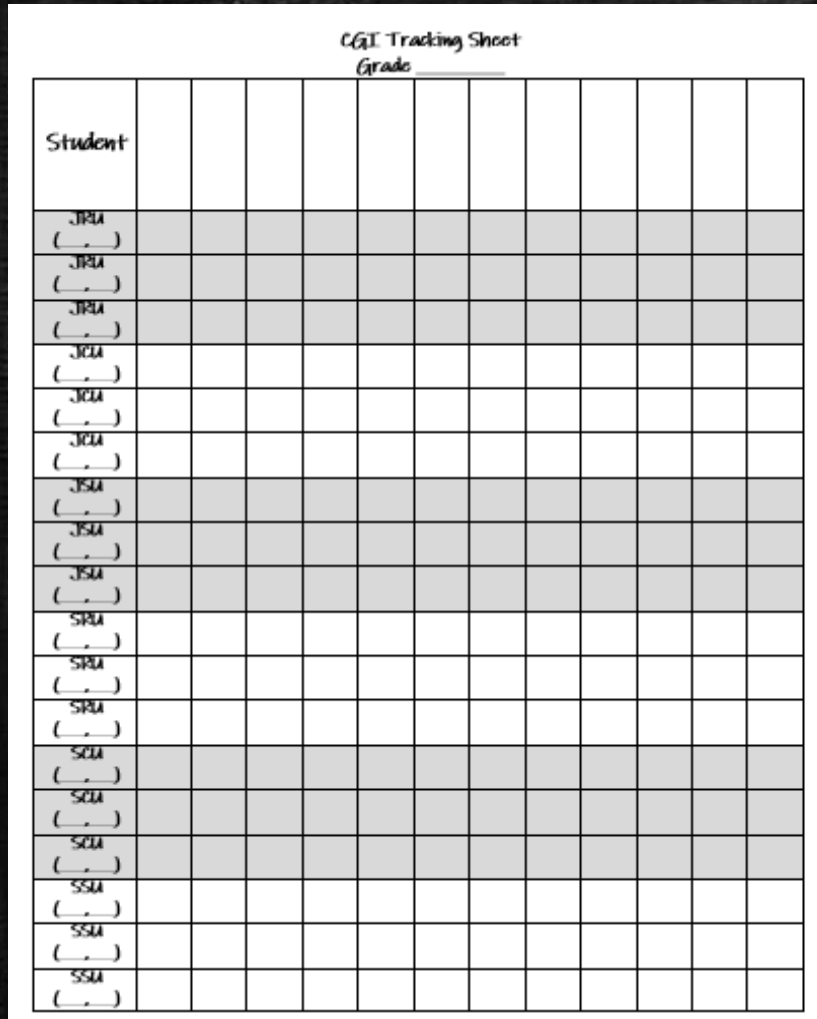
Tracking Students and Keeping Organized

Binder with ALL the GOODS ☺

- Progression Strategy Chart
- Data Sheet that includes ALL Students
- Student Work By Problem Type
- Student/Teacher Interview/Observation Notes
- Reference (To Keep you Refreshed)

*Organize to your Needs

What I Use…



CGI Tracking Sheet
Grade _____

Student												
JRSA (__, __)												
JRSA (__, __)												
JRSA (__, __)												
JCSA (__, __)												
JCSA (__, __)												
JCSA (__, __)												
JSSA (__, __)												
JSSA (__, __)												
JSSA (__, __)												
SRSA (__, __)												
SRSA (__, __)												
SRSA (__, __)												
SCSA (__, __)												
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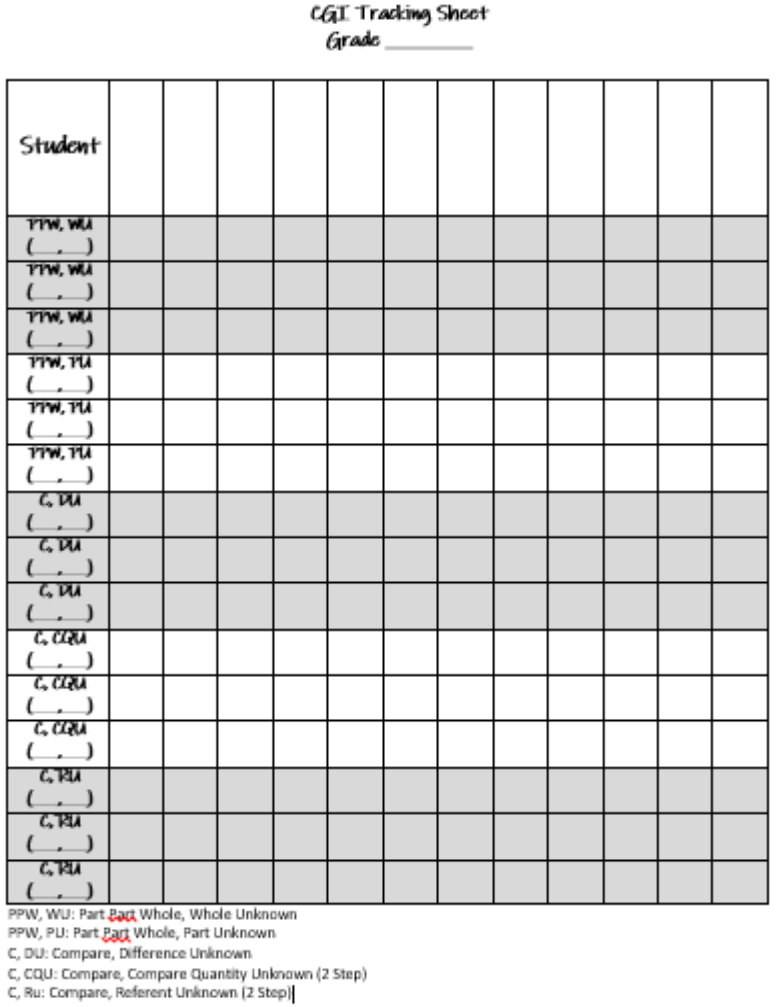
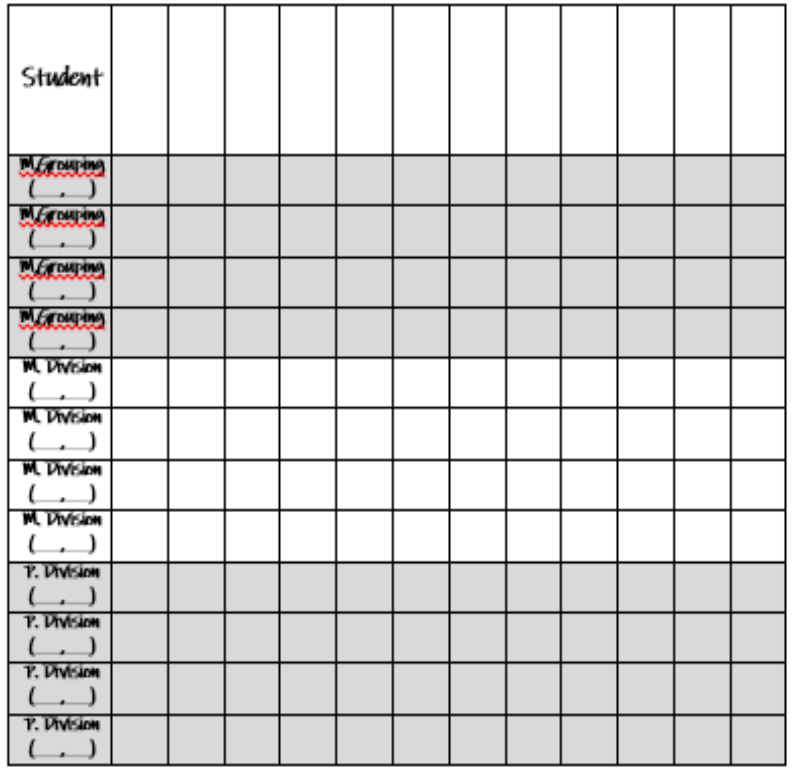


CGI Tracking Sheet
Grade _____

Student												
PPW, WU (__, __)												
PPW, WU (__, __)												
PPW, WU (__, __)												
PPW, PU (__, __)												
PPW, PU (__, __)												
PPW, PU (__, __)												
C, DU (__, __)												
C, DU (__, __)												
C, DU (__, __)												
C, CQU (__, __)												
C, CQU (__, __)												
C, CQU (__, __)												
C, RU (__, __)												
C, RU (__, __)												
C, RU (__, __)												

PPW, WU: Part Part Whole, Whole Unknown
PPW, PU: Part Part Whole, Part Unknown
C, DU: Compare, Difference Unknown
C, CQU: Compare, Compare Quantity Unknown (2 Step)
C, Ru: Compare, Referent Unknown (2 Step)



CGI Tracking Sheet
Grade _____

Student												
M.Grouping (__, __)												
M.Grouping (__, __)												
M.Grouping (__, __)												
M.Grouping (__, __)												
M. Division (__, __)												
M. Division (__, __)												
M. Division (__, __)												
M. Division (__, __)												
P. Division (__, __)												
P. Division (__, __)												
P. Division (__, __)												
P. Division (__, __)												

M. Grouping: Multiplication strategy Grouping

M. Division: Measurement Division (Known Quantity in Groups)

P. Division: Partitive Division (Known groups)

Using CGI as a Math Coach or Inclusion Teacher

On the GO? Bring "IT"

Manipulatives on the Go!

- Unifix Cubes
- Base 10 Blocks
- Counters
- Mini-Whiteboards
- Story Problem Workspace Paper
- Writing Utensils/Erasers
- Math Task Cards/ Problems (I store mine in my binder)

Using CGI as a Math Coach or Inclusion Teacher

On the GO? Bring "IT"

Bag Too Heavy? Create an Organized Manipulative Binder

- Sheet Protectors, or Pouches
- Pre-Made Cardstock Base Ten Models
- Pre-Made Counters
- Blank Number Line/ Ruler
- Laminated Blank Paper (Whiteboard space made light)
- *Workspace Paper (Less likely to show exploration)
- Pouch with Writing Utensils/Erasers

Using CGI as a Coach or Inclusion Teacher

How I make it WORK…

- Conduct Discussions/Sharing within my Groups
- Build Relationship with Classroom Teacher
  - Borrow their Class for a Lesson 1x Week or Month
  - Bring in students from time to time to make extensions.
- Use Previous Student Work for Small Group to Analyze and Connect
- Short time: One Day to Solve/One Day to Share
  - *Advantage: They re-analyze their strategy used.
  - *Disadvantage: Sometimes won't remember thought within strategy.

CGI for me is not a lesson strategy, it's the way I teach.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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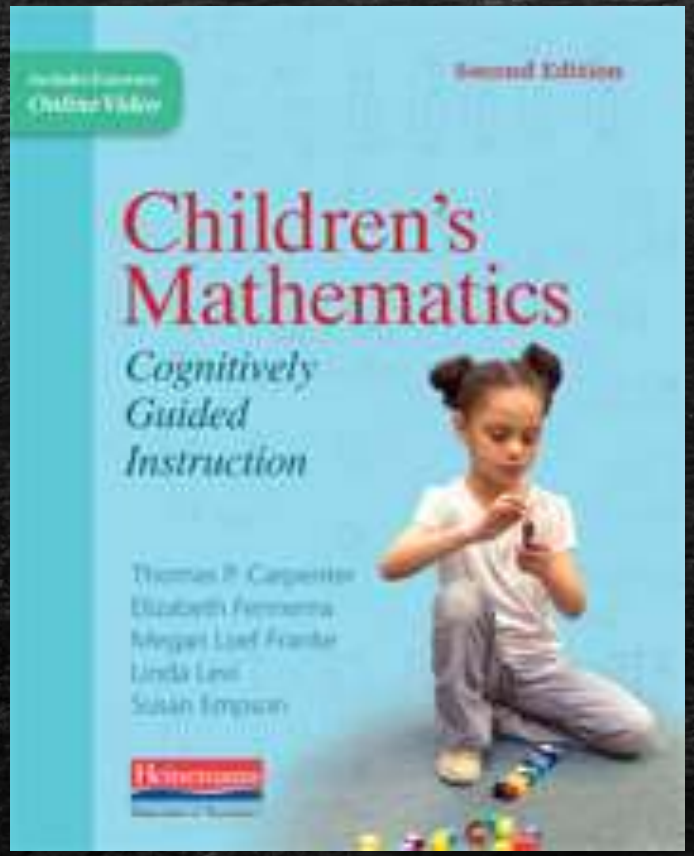
References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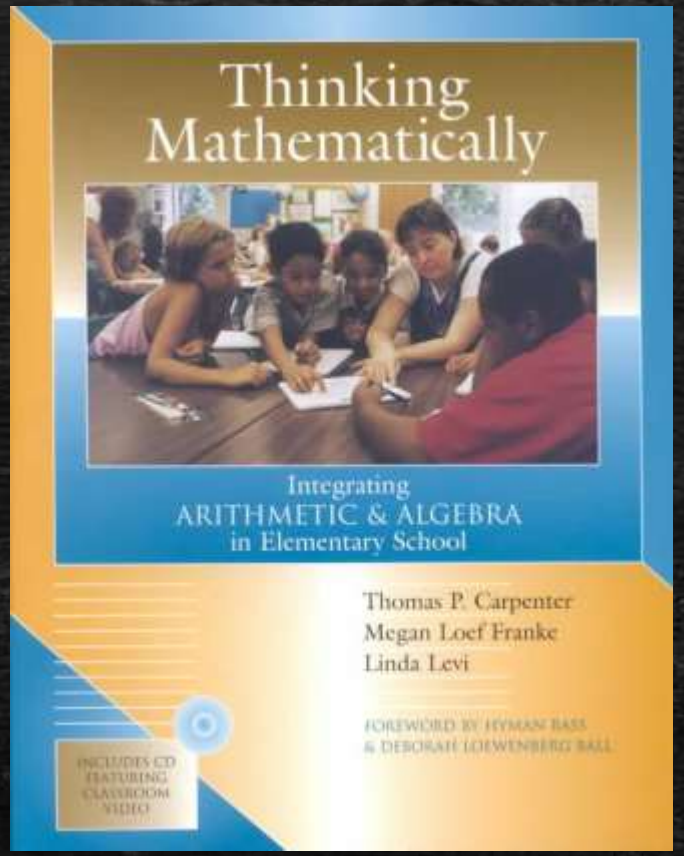
Cognitively Guided Instruction


Thinking Mathematically
Integrating ARITHMETIC & ALGEBRA in Elementary School
Thomas P. Carpenter
Megan Loef Franke
Linda Levi

Thank You!!

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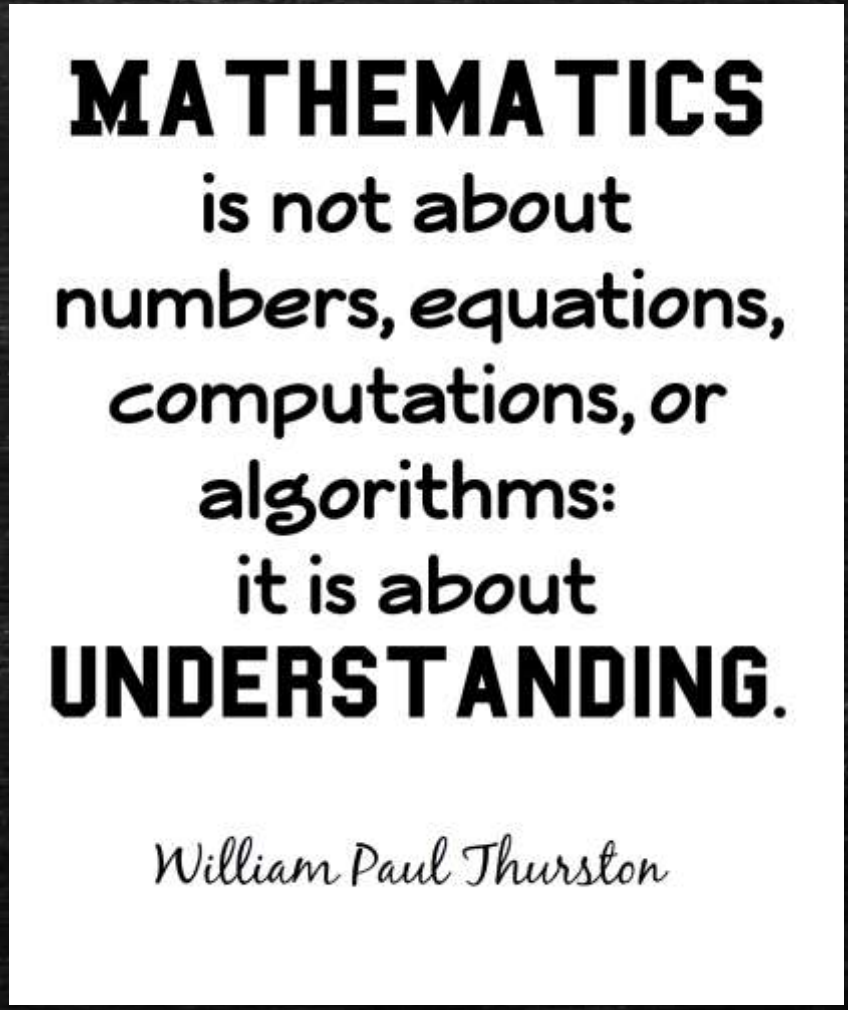

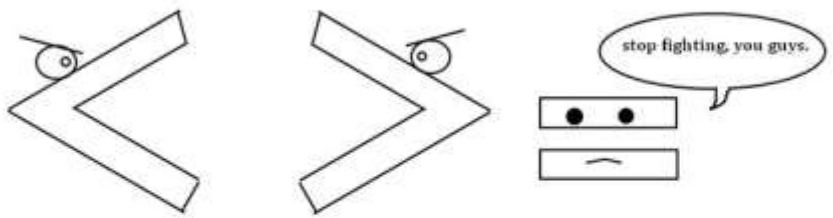

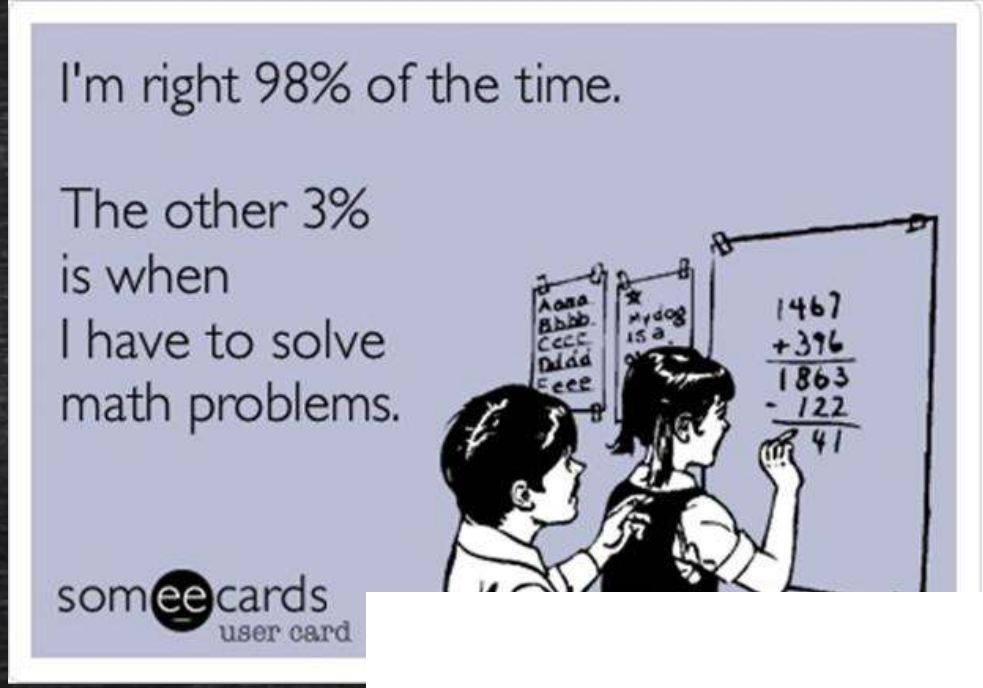

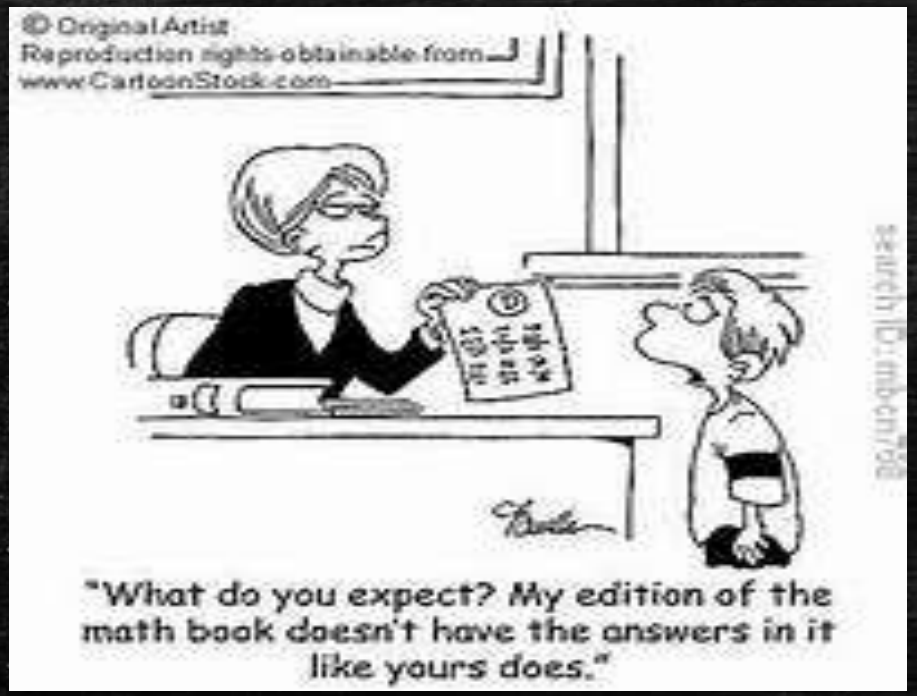

MISTAKES
ALLOW
THINKING TO
HAPPEN