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NCIDA 2008
Keep the Magic in Math

Joanie Gerken, Fellow
Trident Academy

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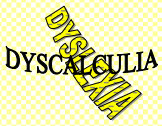
Dyslexia/ Dyscalculia

- Are they related?



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Dyslexia

- 'dys' - meaning poor or inadequate
- 'lexia' - meaning 'verbal language'

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Dyscalculia

- Dyscalculia = "difficulty in learning or comprehending mathematics" (Wikipedia)
  - •Identified in patients suffering brain trauma resulting in math problems
  - •Arithmetic difficulties in calculation and number memory deficits

"dys" = Greek, "badly"

"calculia" = Latin, "calculare", "to count"

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Characteristics of Dyscalculia

- Confusing signs, +, -, x, ÷
- Inability to tell which is larger
- Rely on 'counting on' strategies
- Difficulty with mental math, tables
- Inability to remember concepts, rules, sequences, formulas
- Rotate numbers, 56 as 65
- Difficulty estimating everyday time, money, comparisons in amount and measurement
- Difficulty with score keeping, rhythm-sequential processing; dance, cheerleading

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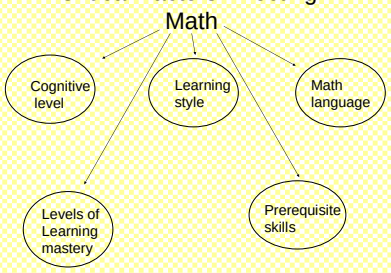
Critical Factors Affecting Math



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Levels of Learning Mastery

Sharma 1989

- Connect new concept to previous knowledge
- Concrete model/ hands on
- Pictures to represent concrete image
- Use numbers and symbols to mathematically represent concept
- Apply concept to real problems, like word problems
- Student teaches the concept to someone else

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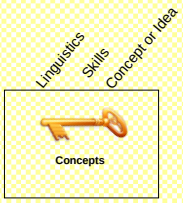
All concepts have 3 key ingredients



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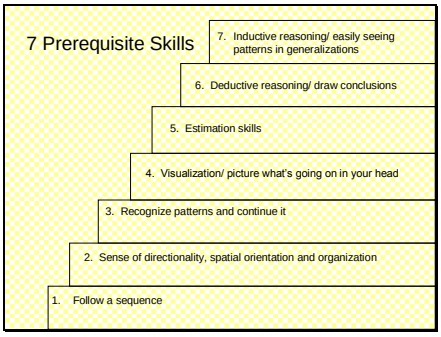

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Error Analysis

- Find the pattern for common errors
- Find the reason for the error
  - memory for facts
  - sequence of steps
  - understanding of process
  - carelessness or lack of attention to detail

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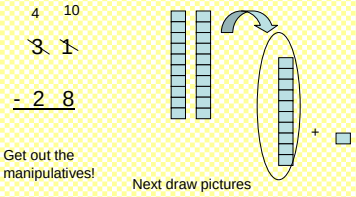
Samples of errors/What do the errors mean?

Refer to prerequisite skills needed!



Get out the manipulatives!

Next draw pictures

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Practice the steps in renaming

- After the concept is solid

5 12 2 14
6 2 3 4

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Steps in multiplication

- Difficulty arises/ just going through the motions

Basic fact? Look closer

```
  65
 X27
 545
130
675
```

Careless error/or concept?

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Use color for emphasize

	Step 1	Step 2
43	43	43
x23	x 3	x20
129	129	860
+860		

Taa daa!

Add it and you are done…

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Look for patterns of errors

- Break down the steps
- Check sequence of steps
- Teach the student to *verbalize* the steps as he goes along

Key ingredients for concepts

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Division

- How many different steps does it take to '*gazinta*' ?

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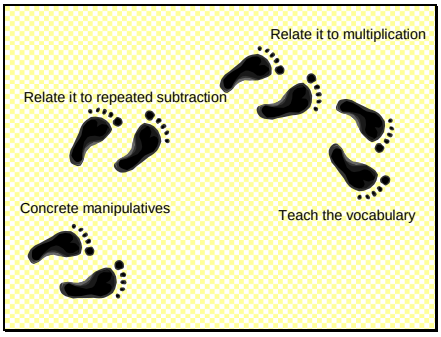

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Looking for a pattern

$$40 \overline{)240}\quad 6$$

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Which is easier to read?

Two delivery trucks start from Central City and Pottsdam City, which are thirty-nine miles apart, making deliveries along Route 7. The first truck leaving Central City makes 7 stops and the truck leaving Pottsdam City make 9 stops. When the trucks meet the truck from Pottsdam has traveled 11 miles farther than the truck from Central City. How far from Central City do the trucks meet?

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How far from Central City do the delivery trucks meet if:

- **Central City and Pottsdam are 39 miles apart**
- **Central City truck makes 7 stops**
- **Pottsdam City truck makes 9 stops**
- **Pottsdam truck goes 11 miles farther than the other**

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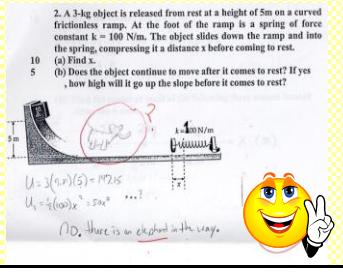
When in doubt, try humor!



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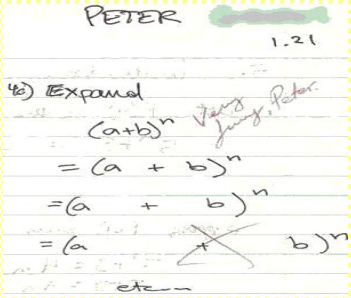

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Factors Influencing All Learning

- Attention difficulties
- Processing deficits
- Memory deficits
- Motor skills difficulty
- Language disorders
- Reading difficulty
- Accuracy
- Rate
- Repetition
- Learning Style

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Orton Gillingham Principles

- **Individualized** ☑
- **Multi-disciplinary** ☑
- **Multi-sensory** ☑
- **Alphabetic-Phonetic** → Symbols/meaning ☑
- **Synthetic-Analytic** ☑
- **Linguistic** ☑
- **Systematic** ☑
- **Sequential** ☑
- **Cumulative** ☑
- **Cognitive** ☑
- **Communication Emphasized** ☑
- **Emotionally Sound** ☑

☑ Diagnostic/prescriptive

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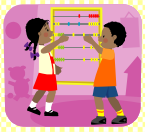
Strategies

- Text books are often less useful with our students
- Provide many opportunities to practice and review



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Some Things to Remember:

Lange

- identify and analyze errors,
- master skills first, then review and practice to retain the skills,
- group students as homogeneously as possible,
- *don't get locked into groups----change them as kids progress,*
- provide appropriate and effective models for students:
  - -- be clear and direct
  - -- build basic pre-skills
  - -- provide lots of examples and practice opportunities,

And

-- **TEACH LESS MORE THOROUGHLY**

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Resources

- dlange@tridentacademy.com
  middle school math coordinator
- www.dyscalculia.org
- www.wikipedia.com
- www.tridentacademy.com
  choose smart board activities

- Handouts– http://marysilgals.tripod.com/northcarolinaida