



## Developing Computational Fluency in Addition and Subtraction

Video Note Taking Guide  
Presenter: Kathy Ernst



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### COURSE OBJECTIVES



Participants will:

- Learn about alternative problem solving strategies in addition and subtraction
- Define computational fluency
- Develop instructional strategies for building on what children already know
- Understand the big ideas underlying a student's understanding of quantity, addition and subtraction

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An appropriate motto for a Japanese teacher would be, "structured problem solving."

In the United States, the motto is, "learning terms and practicing procedures."

James W. Stigler and James Hiebert, The Teaching Gap: Best ideas from the World's Teachers for Improving Education in the Classroom (New York, NY: The Free Press, 1999)

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## High Quality Teaching Practices



Teachers benefit from:

- working together to reflect on lessons
- observing each other to identify teaching strengths and weaknesses
- planning how they can support and extend student thinking about mathematics

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When children *invent* procedures, they construct *understanding* of Mathematics.



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## Mathematical Understanding



Students benefit from spending a significant amount of time:

- Exploring mathematical relationships
- Discovering or inventing procedures
- Solving problems

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**A Good Problem Solver Is...**



- **CURIIOUS.....**Wonder about things, ask questions, explore to find out more!
- **FLEXIBLE.....**Look for different ways to solve a problem.
- **PERSISTENT.....**Don't give up easily. Take time to think and keep on trying.
- **A RISK TAKER.....**Try new or challenging things. Don't be afraid to make mistakes—they are learning opportunities!
- **REFLECTIVE.....**Take time to think about what you're doing, why you're doing it, whether it makes sense, and how you can do it better.

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**Guidelines for Problem-Solving**



- **Help each other do your best thinking.**
- **Give help or a hint *only* if the learner wants it. (Would you like help; a hint?)**
- **Help the learner discover solutions and mistakes. (How did you get that? Show me how you figured it out.)**
- **If you disagree with someone's solution or method, ask him how he got it. If you still disagree, tell him why. Politely explain your own thinking.**

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**Computational Fluency**



**EFFICIENCY**

**ACCURACY**

**FLEXIBILITY**

Susan Jo Russell, *Relearning to Teach Arithmetic: Addition and Subtraction*. (Parsippany, NJ: Dale Seymour Publications, 1999).

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**On Saturday, I walked in the park and saw 39 tulips blooming. On Sunday I saw 54 more tulips blooming. How many tulips did I see in bloom?**

**After the rainstorm, I saw 100 earthworms on the sidewalk. At recess, I saw only 67 worms. How many worms disappeared?**

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**I was on the 28<sup>th</sup> floor of a very tall building in New York City. I went on the elevator and got out at the 72<sup>nd</sup> floor. How many floors did I travel on the elevator?**

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**In Summary**

- **When teaching mathematics :**
- **Allow students to show you how they think**
- **Start teaching where your students are, moving them forward**
- **Honor diversity of thinking**
- **Teach students to become efficient users of strategies**

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