

# **Math 911!**

## ***Foundations for Success***

### **The National Mathematics Advisory Panel Final Report—2008**

Sandy Sanford  
Riverside County Office of Education  
Riverside, California



U.S. Department of Education • Teacher to Teacher Initiative • Supporting Success



# Equality matters

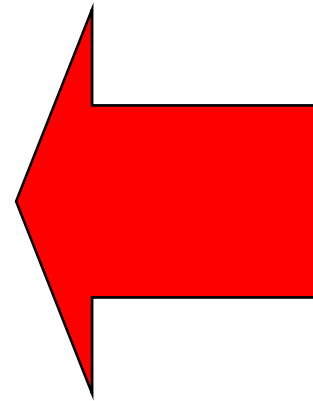
## Operational vs. Relational

$$2x - 3 = 7$$

$$2x - 3 + 3 = 7 + 3$$

$$2x = 10$$

$$x = 10 \div 2 = 5$$



E.J. Knuth, A.C. Stephens, N.M. McNeil, & M.W. Alibali, "Does understanding the equal sign matter?: Evidence from solving equations," *Journal for Research in Mathematics Education* 37, no. 4 (2006): 297-312.



# Outcomes

- Teachers will. . .
  - be able to describe the panel’s mandate, composition, and general report outline
  - be able to describe the panel recommendations that directly affect teachers
  - participate actively in discussions regarding selected report issues and provide input on those issues to the U. S. Department of Education.



# National Mathematics Advisory Panel

- Presidential Mandate
- Impetus for Creation
- Composition
- Methodology



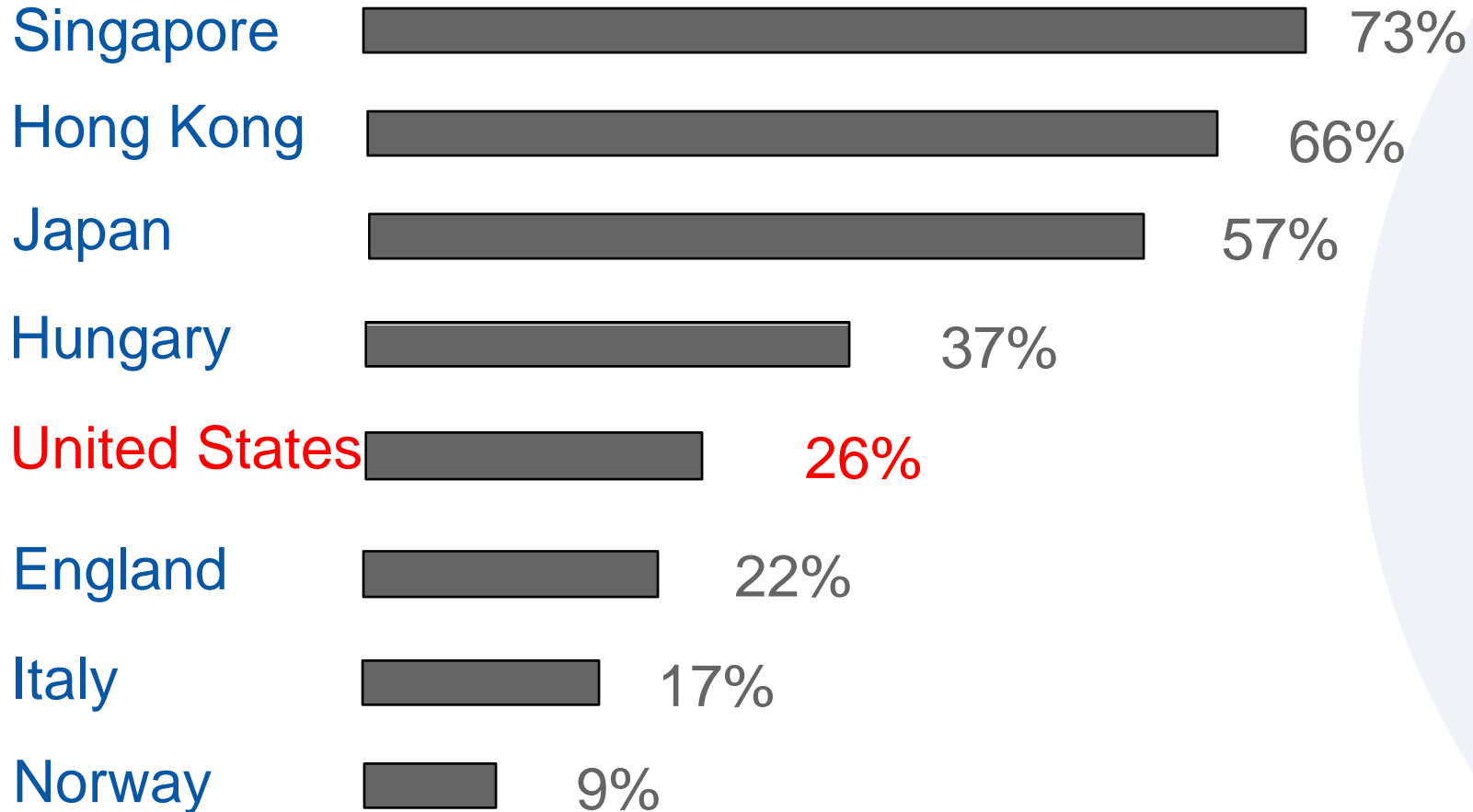
# Task Groups & Subcommittees

- Task Groups
  - Conceptual Knowledge & Skills
  - Learning Process
  - Instructional Practices
  - Teachers & Teacher Education
  - Assessment
- Subcommittees
  - Standards of Evidence
  - Survey of Algebra I Teachers
  - Instructional Materials



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Mathematics Assessment, and Trends in International Math and Science Study (TIMSS), 2003 International Report on Mathematics and Science.

# Grade 8 math (% proficient)



Global ranking by researcher Gary Phillips who statistically linked the 2003 TIMMS with 2007 NAEP for 8<sup>th</sup> grade math. *Education Week*, 27 (34) April 23, 2008.

# First Things First

- PreK-8 curriculum streamlined
- How children learn
- Teachers in central role
- Instruction informed by research
- Improved assessments
- Rigorous Research



# Findings and recommendations: General categories

- Curricular content
- Learning processes
- Teachers and teacher education
- Instructional practices
- Instructional materials
- Assessment
- Research policies and mechanisms



# Central Role of Algebra

- Major topics of school algebra
- Critical foundations of algebra
- Benchmarks for critical foundations



# Content: Select issues

- Streamlined curriculum
- Avoiding revisiting topics w/o closure
- Fractions
- Major topics of school Algebra
- Critical foundations of algebra
- Benchmarks for the critical foundations



# Interaction #1—Teacher input

## Student difficulty with fractions

1. Why are fractions so difficult for students?
2. What works when you are teaching fractions?
3. How would you rate your understanding of fractions on a 1 to 10 scale?



# **Interaction #1—Directions**

## **Student difficulty with fractions**

- Table groups answer questions 1 & 2
- Answer on a single worksheet (#1)
- Individuals answer #3 anonymously using worksheet #1A
- We will share out responses to 1 & 2
- Worksheets will be collected

**Use Interaction  
Worksheet #1 & #1A**



# Learning processes: Select issues

- EFFORT matters!
- Conceptual, computational, & problem solving
- Arithmetic facts learned to automaticity
- Difficulty with fractions



# Interaction #2—Teacher input

## Conceptual and computational

1. How do you reinforce conceptual understanding and computational fluency in your classroom?



# **Interaction #2—Directions**

## **Conceptual and computational**

- Table groups answer question 1
- Answer on a single worksheet
- We will share out responses
- Worksheets will be collected

**Use Interaction  
Worksheet #2**



# Interaction #3—Teacher input

## Power of EFFORT!

1. In your classroom what do you think is more important for student achievement—inherent ability (talent) or effort?
2. How do you emphasize effort in your classroom?
3. What do your students think about effort versus talent?



# Interaction #3—Directions

## Power of effort!

- Table groups answer questions 1, 2, & 3
- Answer on a single worksheet
- We will share out responses
- Worksheets will be collected

**Use Interaction  
Worksheet #3**



# Teacher and teacher education: Select issues

- Mathematical content knowledge
- Mathematical preparation
- Mathematics specialists at elementary



# Interaction #4—Teacher input Math specialists at elementary

1. What do you see as the advantages and disadvantages of an elementary school using a full time mathematics teacher?



# **Interaction #4—Directions**

## **Conceptual and computational**

- Table groups answer question 1
- Answer on a single worksheet
- We will share out responses
- Worksheets will be collected

**Use Interaction  
Worksheet #3**



# Instructional practices: Select issues

- Power of formative assessments
- Positive effects of explicit instruction
- No research base for pure forms
  - Teacher directed
  - Student centered
- Allow gifted students to move ahead



# Summary

- Why was there a NMP report?
- What was the general organization & methodology?
- What findings & recommendations are particularly relevant to teachers?
- What is the importance of your input?



# Want to know more?

Sandy Sanford

ssanford@rcoe.us

951-675-2953

Riverside County Office of Education

Educational Services Division

PO Box 868

Riverside CA 92502

