We're in this together!

Supporting students' collaborative learning in the math classroom

- On an index card
  - Write your name (for the raffle!)
- Also write how you are
  - smart in math and
  - group smart

We're in this together!

Supporting students' collaborative learning in the math classroom

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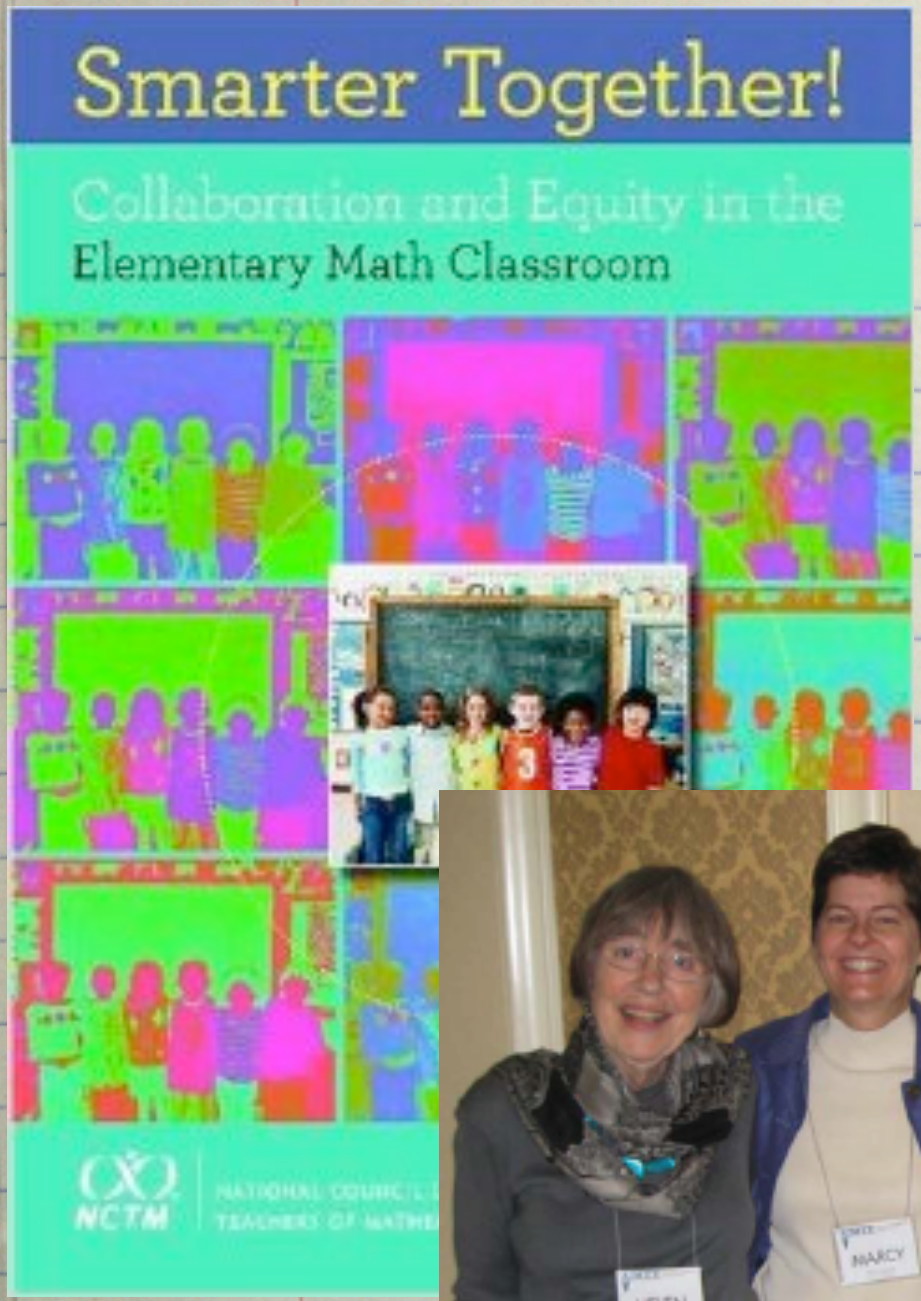
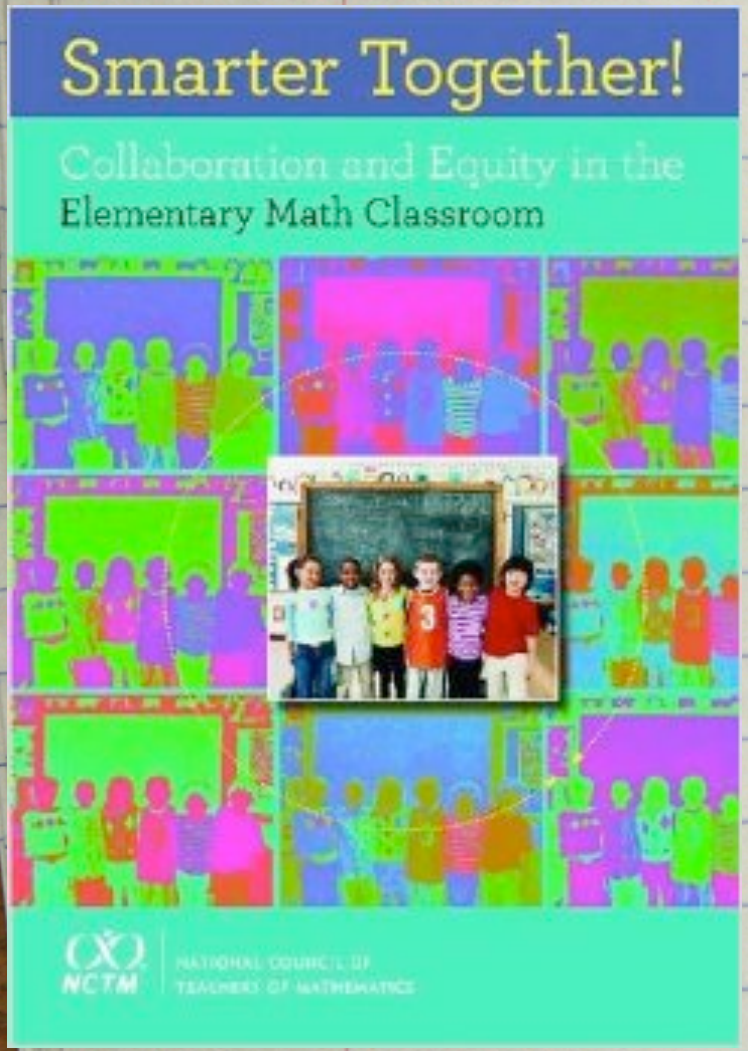
Session Overview

- Introductions
- Competitive or collaborative learning?
- Task 1: Number ordering
- Debrief 1
- Task2: Matching Representations
- Debrief 2
- Take Away + Book Raffle!



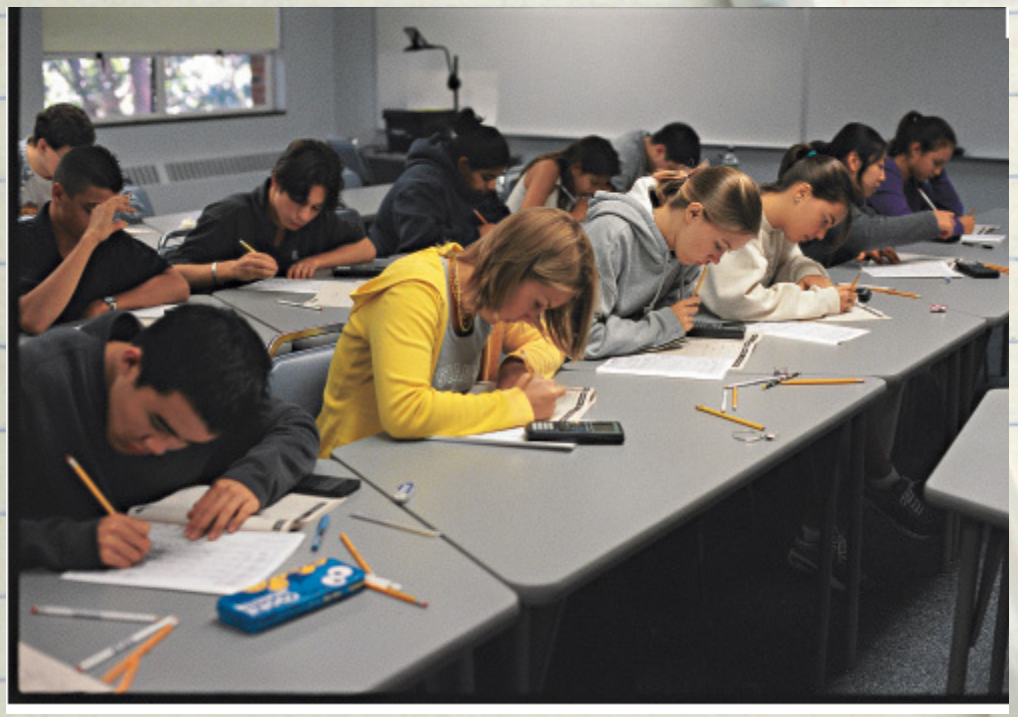
***Smarter Together! Collaboration and Equity in the Elementary Classroom*, Reston, Va: NCTM.**

Smarter Together!



- What does it Mean to be Smart in Math?
- Teaching Norms and Roles
- Addressing Status Issues
- Selecting and Designing Groupworthy Tasks
- Three Teachers' Stories
- Resources for Groupworthy Tasks
- Adapting Textbook Problems

Images of Smart



Rethinking Smart

The Trouble We're In

… the students who have been verbal from the beginning, answering questions, asking questions and volunteering often, are the ones that I have started to view and that my CT views as the 'smartest' and most highly valued students. (Teacher intern)

The Trouble with Competitive Structures

- Survival of the fittest
- Unproductive peer-to-peer interactions
- Over and under participation
- Rich get richer, poor get poorer
- Inequitable opportunity to learn

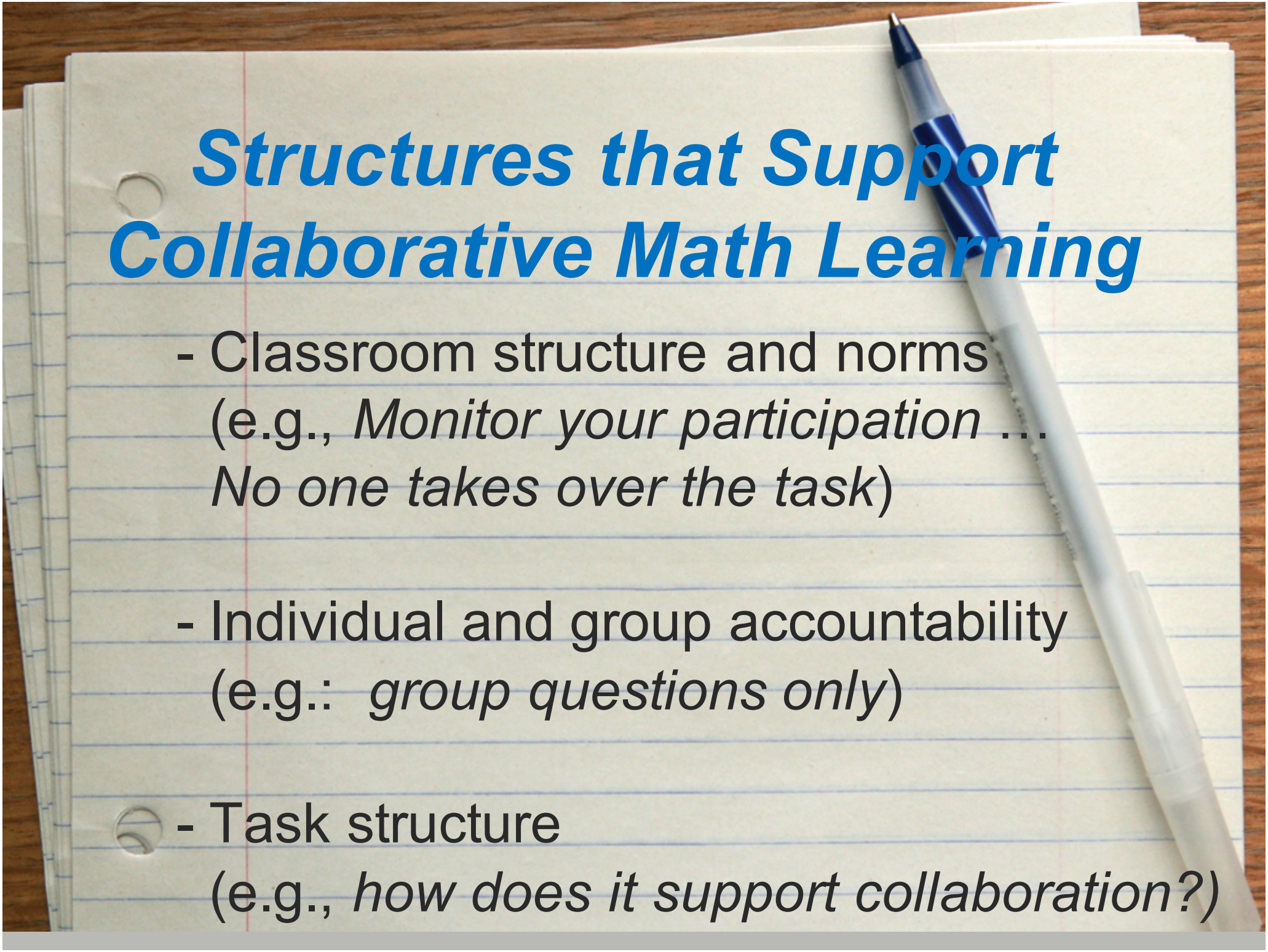
Why Collaborative Learning in Math Classrooms

- Classrooms serve as a mirror and a window of society
- Teachers teach more than content
- Teachers set classroom norms and expectations
- The structure of the learning environment and activities matter
- Competitive or collaborative learning environments

Why Collaborative Learning in Math Classrooms?

Research on group work: positive relationship between student interaction in small groups and average learning gains.

Cohen & Lotan, 1997



Structures that Support Collaborative Math Learning

- Classroom structure and norms
  (e.g., *Monitor your participation … No one takes over the task*)

- Individual and group accountability
  (e.g.: *group questions only*)

- Task structure
  (e.g., *how does it support collaboration?)*

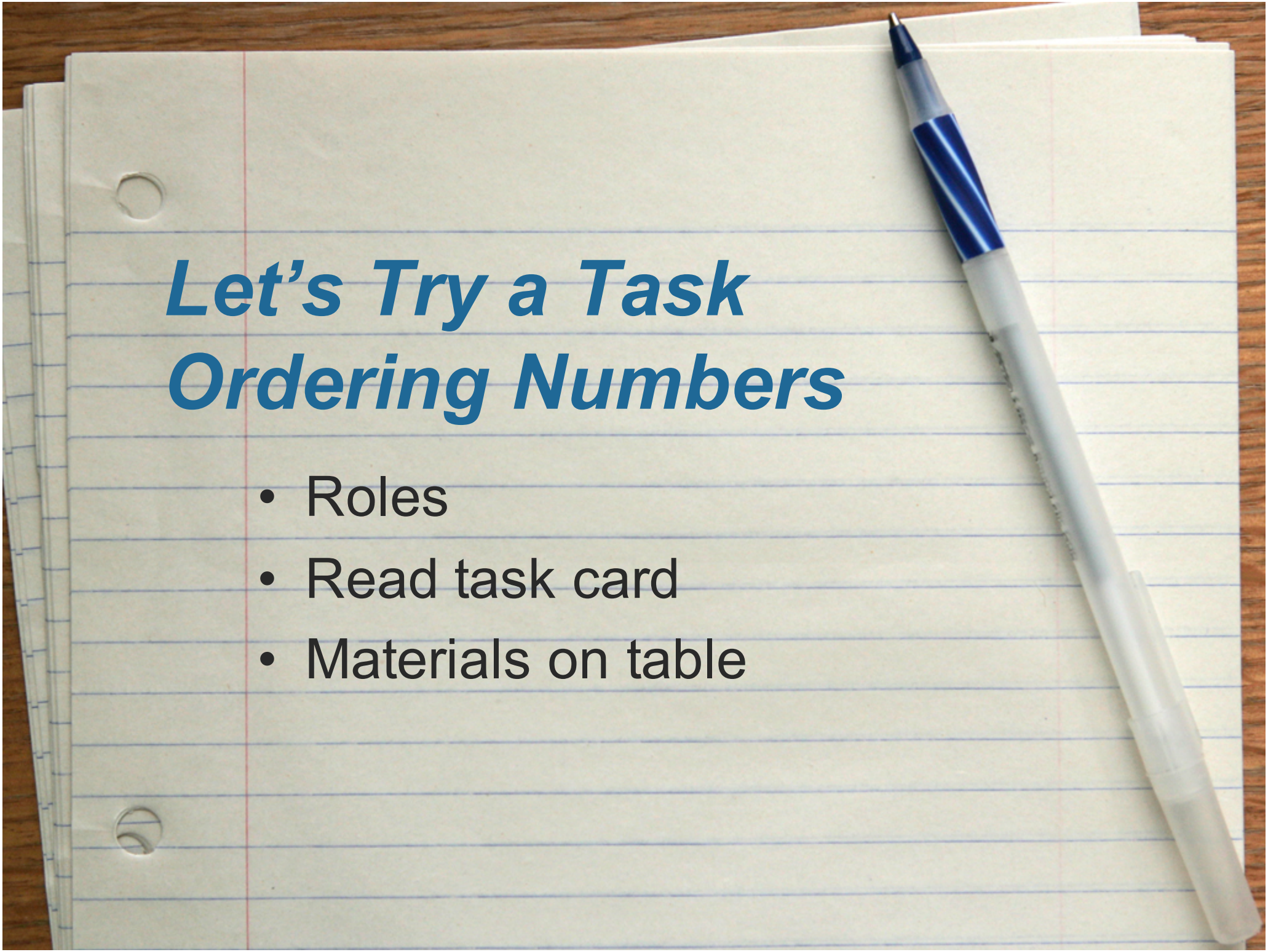
Rethinking Tasks…

Routine Tasks

- Have a right answer
- Can be done more quickly and efficiently by one person than by a group
- Are too low level (low cognitive demand)
- Involves simple memorization or routine learning

Complex Tasks

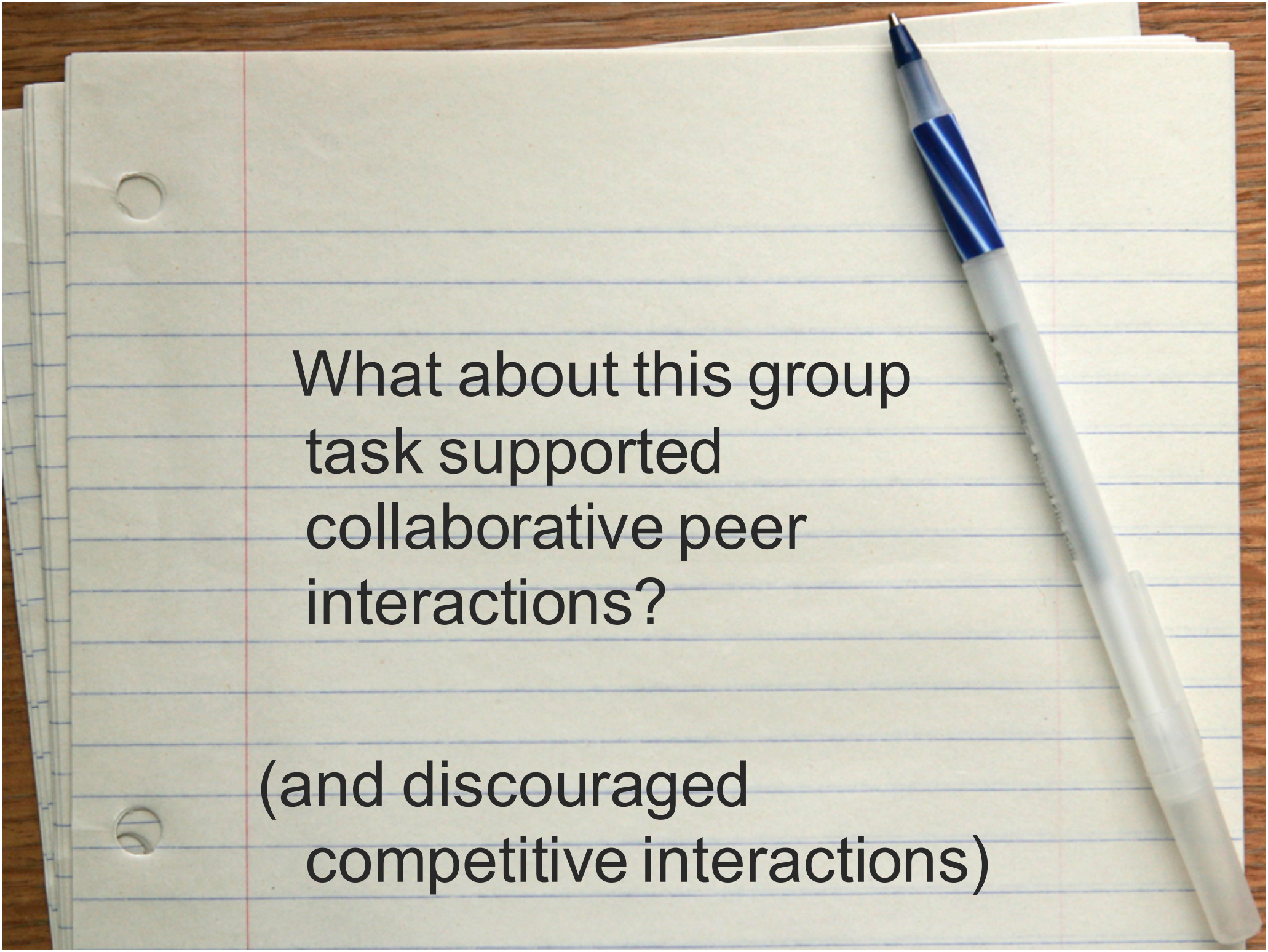
- Have more than one answer, more than one way to solve
- Allow different students to make different contributions
- Is challenging (high cognitive demand)
- Requires a variety of skills and behaviors


Let's Try a Task
Ordering Numbers
• Roles
• Read task card
• Materials on table

To be successful in this task your group will need to:

- Pick a common representation
- Ask questions
- Listen carefully to everyone
- Think about different strategies
- Build on each other's ideas
- Come to consensus
- Use consensus to influence thinking
- Think flexibly about numbers (think about fractions, decimals, and percents)
- Encourage each other
- Ask why (justify answers)

Together your group has the abilities to solve this task.

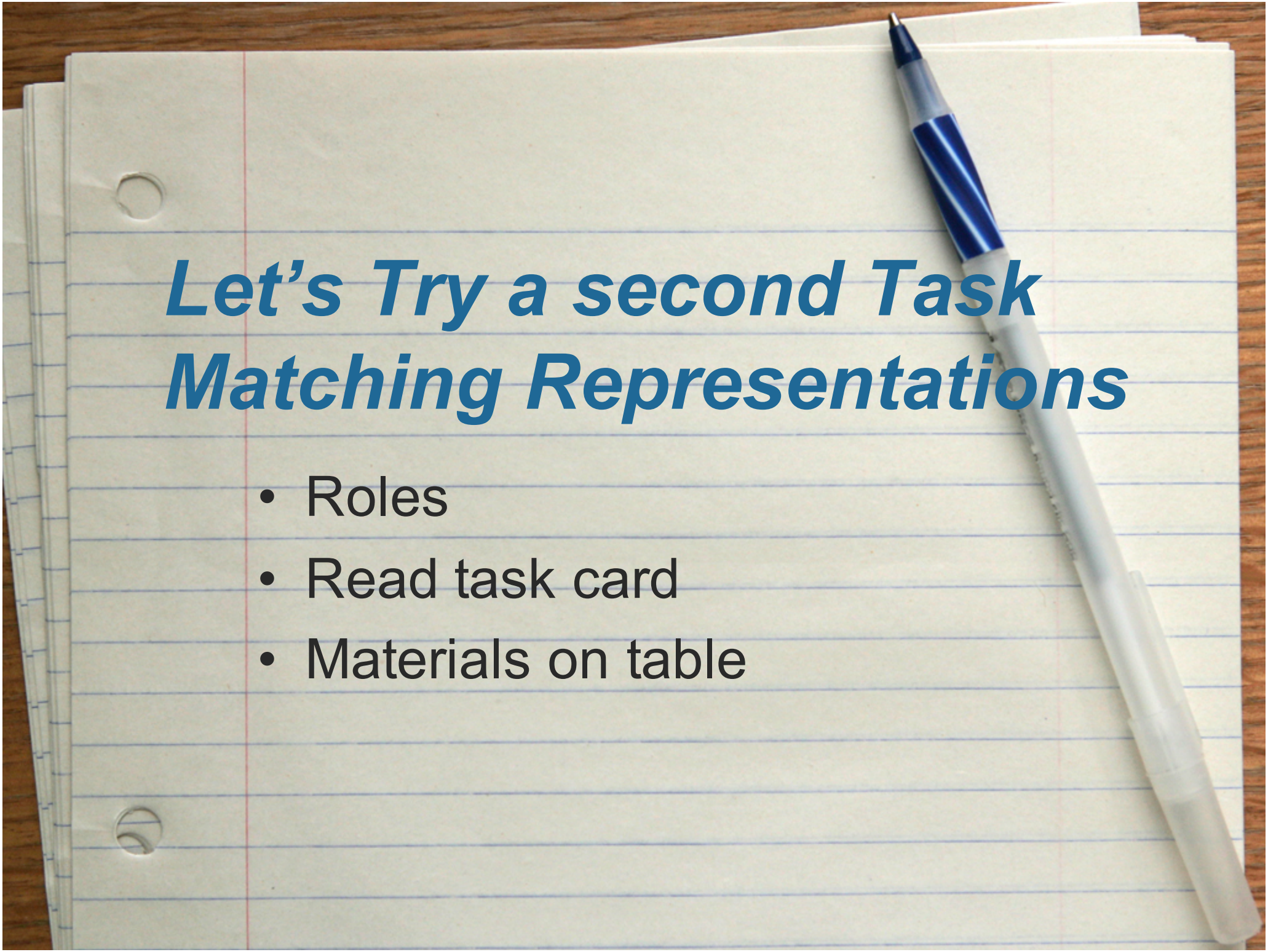

What about this group task supported collaborative peer interactions?
(and discouraged competitive interactions)

Collaborative structures that support math learning

- Classroom structure and norms
  (e.g., *Monitor your participation … No one takes over the task*)

- Individual and group accountability
  (e.g.: *group questions only*)

- Task structure
  (e.g., *how does it support collaboration?)*



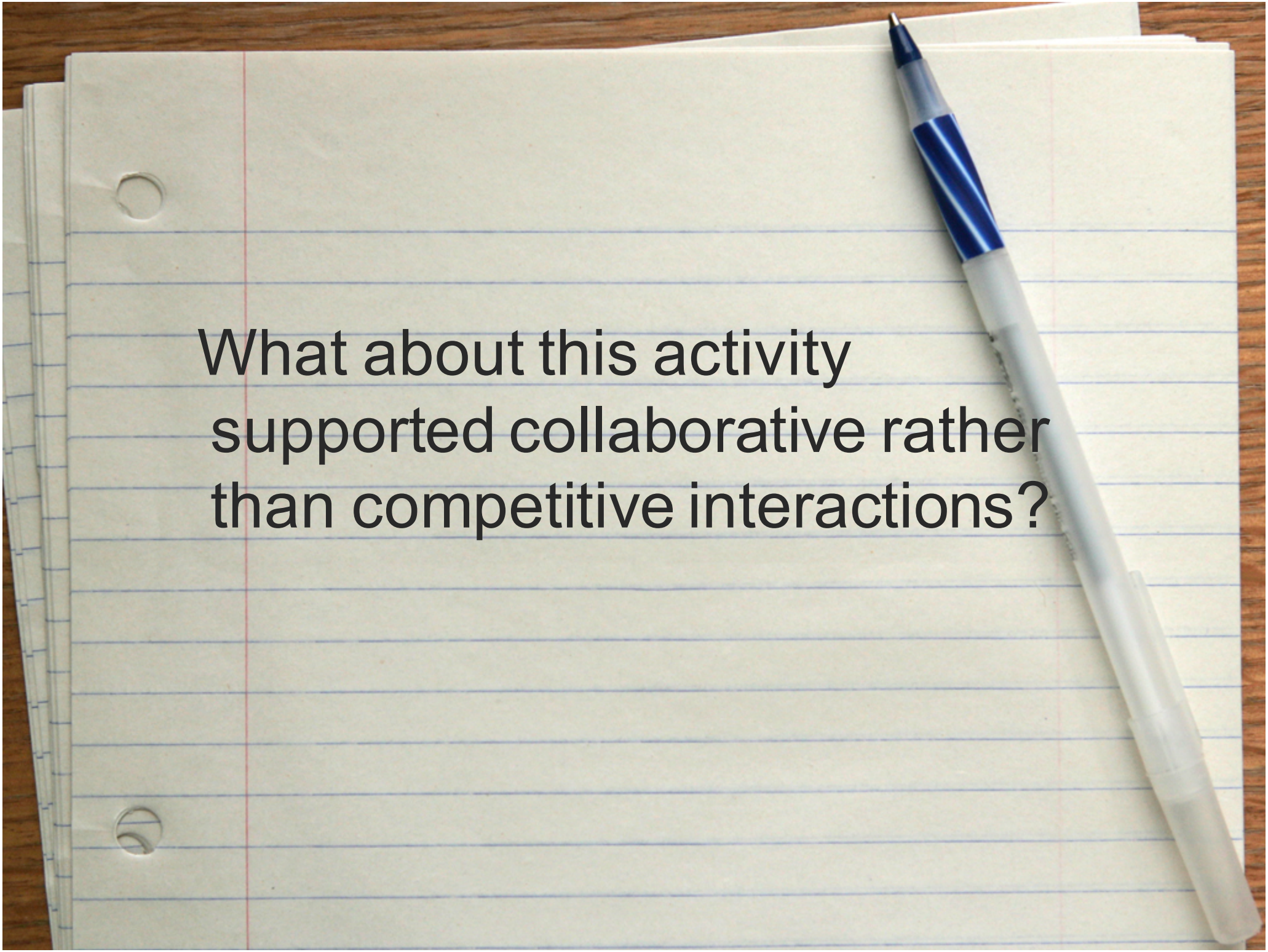
Let's Try a second Task Matching Representations

- Roles
- Read task card
- Materials on table

To be successful in this task your group will need to:

- Notice connections across representations
- Describe connections you notice
- Communicate visual reasoning
- Make comparisons and notice differences
- Be precise
- Listen carefully
- Learn from making mistakes
- Ask questions
- Persevere by generating alternative

Together your group has the abilities to solve this task.


What about this activity supported collaborative rather than competitive interactions?

Collaborative structures that support math learning

- Classroom structure and norms
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- Individual and group accountability
  (e.g.: *group questions only*)

- Task structure
  (e.g., *how does it support collaboration?)*

To help more students succeed at math…

- Need to change perceptions of math smart
  - Broaden what it means to be smart in school
  - Cultivate a collaborative mindset Everyone has something to contribute, and has something to learn from others.

Is the task groupworthy?

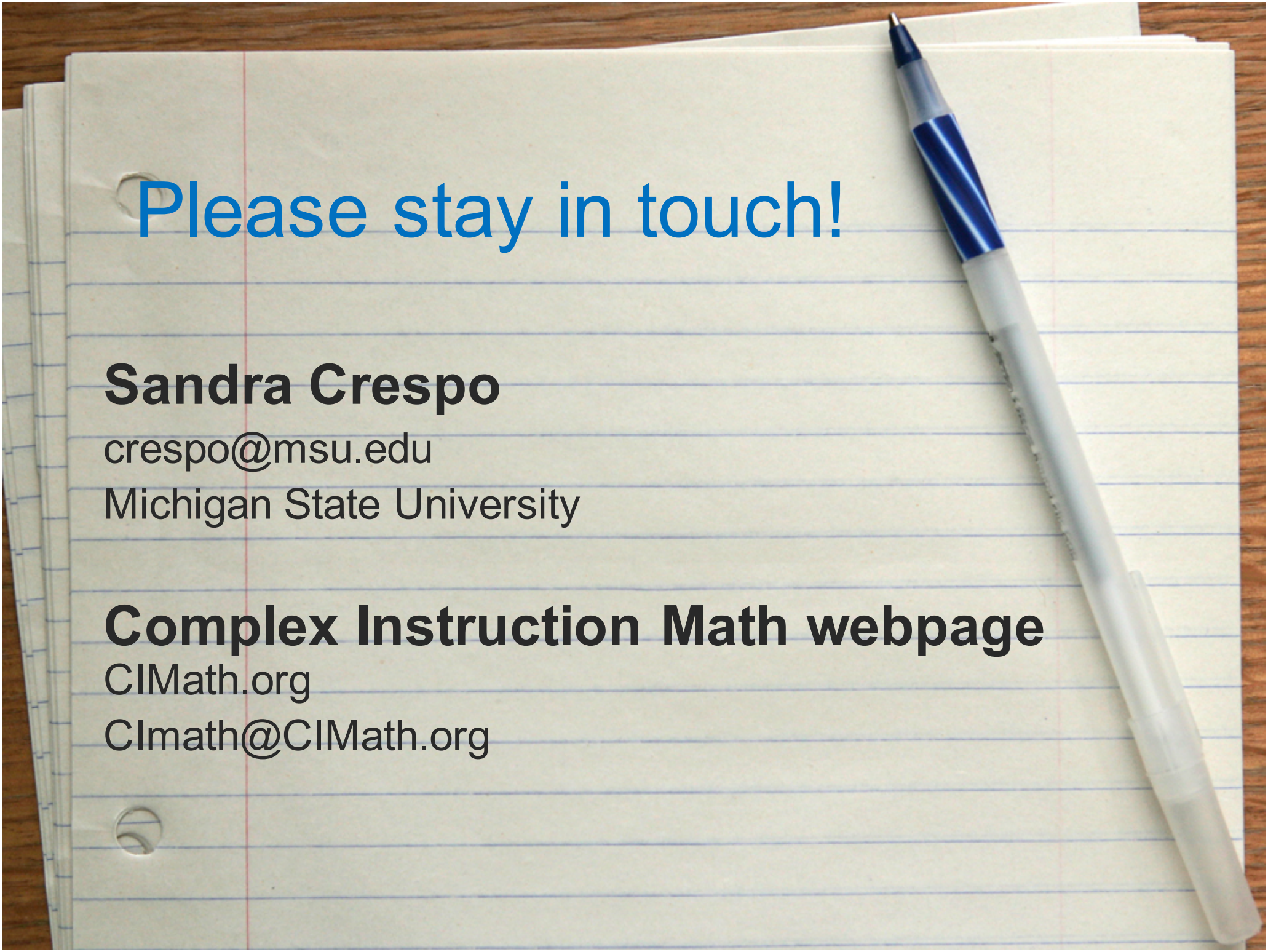
Mathematics	Accountability	Materials
• Is the mathematics important? • Is the task complex and open-ended? • Does it require multiple math smarts?	• Does the group have a shared product? • Can individual members demonstrate what they know? • Are there multiple ways to demonstrate competence?	• Do the kinds and number of materials allow for all students getting their hands on them? • Do the materials support or inhibit collaborations? • Do structures around materials support collaboration?

Norms to Support a Collaborative Mindset

- …Yet
- Group questions only
- No one is done until everyone understands
- No talking outside our group
- No one takes over and everyone contributes
- Giving up will not make us smarter!
- What more can we learn here?
- …

Conclusion

- Individualistic smart is not enough
- Growth and fixed mindsets do not develop in isolation
- Persistance and productive disposition do not develop in isolation
- Developing a culture of collaborative learning requires student and teacher persistence
- We can learn more together than by ourselves
- *No one is as smart as all of us together.*


Please stay in touch!
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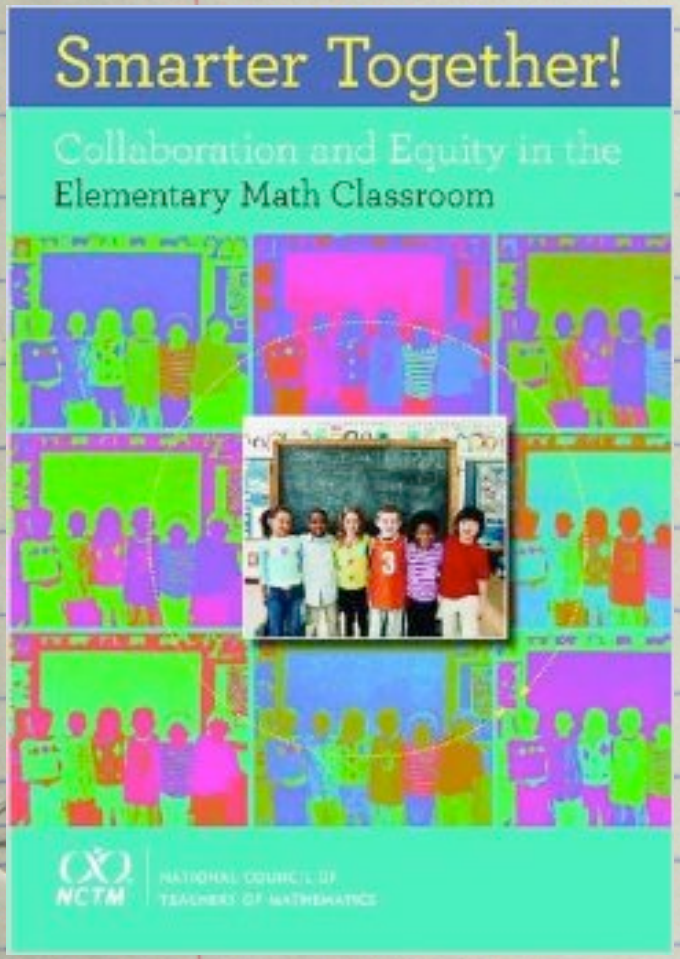
Raffle!



Featherstone, Crespo, Jilk, Oslund, Parks, & Wood (2011).

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