

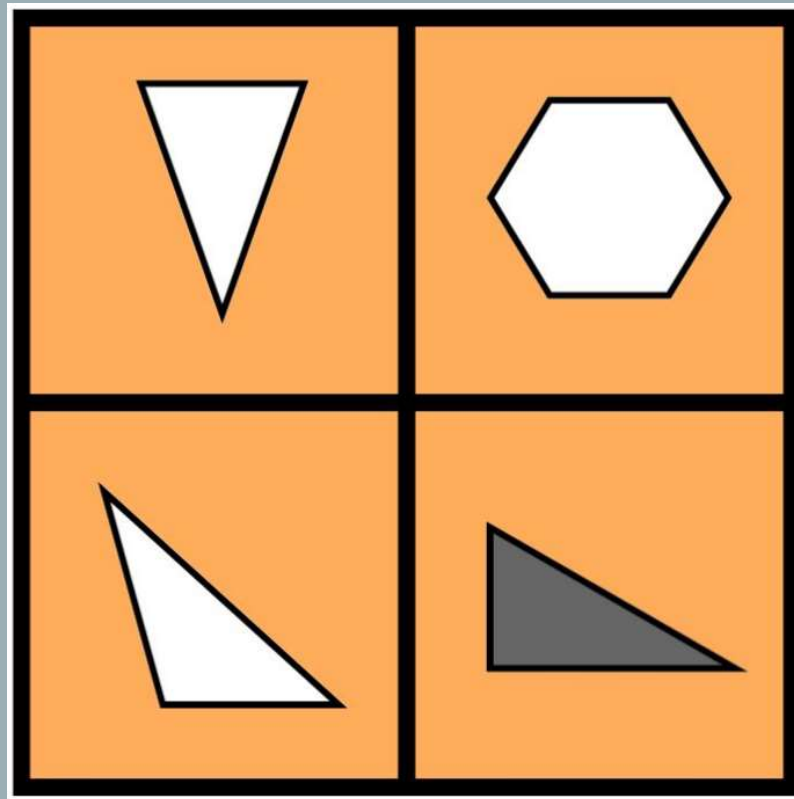
“Teachers and parents have the opportunity to shape their children’s mathematical futures. One of the most important contributions you can make is to dispel the idea that only some children can be successful at math or that math is a ‘gift’ that some children have and some do not. This idea permeates American society, but it has been completely disproved by the science of the brain and learning. The idea that some children can do well in math and some can’t is a damaging myth that is harmful to children’s mathematical development. All students can achieve the highest levels of math in school if given the right opportunities and support.”

- Dr. Jo Boaler, Stanford University

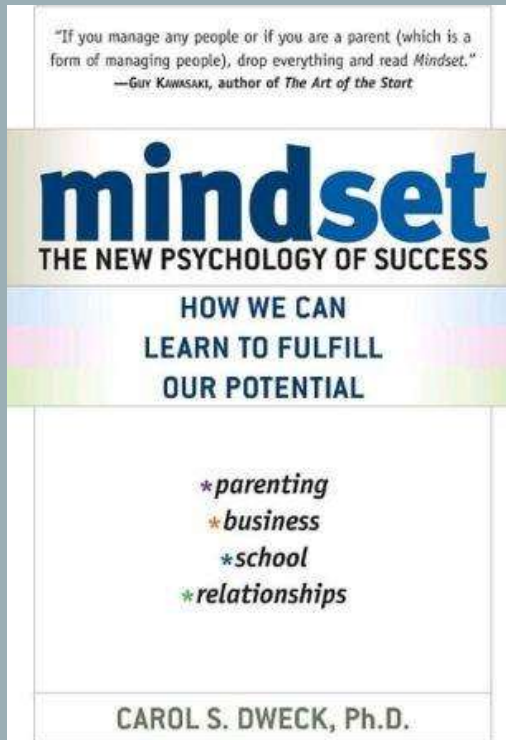
# **GROWTH MINDSET & MATH: PRACTICAL STRATEGIES FOR EDUCATORS**

Ms. Sara Folger & Dr. Jeff Edmonds  
Catherine Cook School  
Chicago, IL

Which one doesn't belong?



# MINDSET: Quick Survey



# WHAT IS MINDSET?

- Beliefs about yourself and your most basic qualities
- Two types of mindset:

## 1) Fixed

Intelligence, talent, or ability are innate and remain the same throughout life no matter what one does. (“math gene” myth)

## 2) Growth

These qualities are simply a starting point and more is always possible through effort and personal development.

# WHO WE ARE & WHY WE ARE HERE

Sara Folger & Jeff Edmonds

*Our Mindset Journey*

# WHAT TO EXPECT TODAY

How to Promote a Growth Mindset Through...

- 1) Language
- 2) Classroom Procedures & Structures
- 3) Assessment & Grading

# LANGUAGE

- Adults' language and attitudes are of critical importance!
- Teach kids about Growth Mindset.



- Spread the word to other teachers, administrators, and *especially* parents.



# THINGS WE SAY

## I) Mistakes

- Teach students the importance of exploring challenging work and making mistakes.
- Celebrate mistakes. Find the logic in them.
- “Congratulations! Your brain just grew!”
- “I want to see more mistakes from you today.”
- “I’m sorry. I failed you. This was too easy. Your brain didn’t grow.”

# THINGS WE SAY

## 2) Praise & Feedback

- Never use the word “smart”.
- Emphasize thoughtfulness rather than speed.
- Emphasize effort rather than accuracy.
- “Be proud of this! I can see you worked really hard.”
- “I love how deeply you’re thinking about this.”
- “You’ve really supported your answer.”

# THINGS WE SAY

3) Instead of \_\_\_\_\_, say \_\_\_\_\_.

- “I don’t get this.” → “I don’t get this YET!”
- “This is hard.” → “This is FUN!”
- “What is 5 times 4?” → “How would *you* do 5 times 4?”
- “Do you agree?” → “Why does that make sense?”
- “What did you get?” → “What do you think?”
- “I got that wrong.” → “My brain just grew.”
- “I give up.” → “What else could I try?”
- “This is so easy for her.” → “What can I learn from her?”

# NUMBER TALK

$$18 \times 15$$

# CLASSROOM PROCEDURES & STRUCTURES

1) Emphasize the work real mathematicians do and how adults use math in their daily lives.

- ❖ Ask important questions
- ❖ Challenge assumptions
- ❖ Look for and analyze patterns
- ❖ Create multiple representations
- ❖ Make conjectures and predictions
- ❖ Problem solve
- ❖ Work cooperatively with others
- ❖ Justify and prove
- ❖ Explain and teach
- ❖ Calculate and compute
- ❖ Apply formulas and algorithms

# CLASSROOM PROCEDURES & STRUCTURES

- 2) Provide multiple ways to be successful.
  - Independent, partner, small-group, and full-class work
  - Multiple strategies for problem solving
  - Multiple representations to make connections

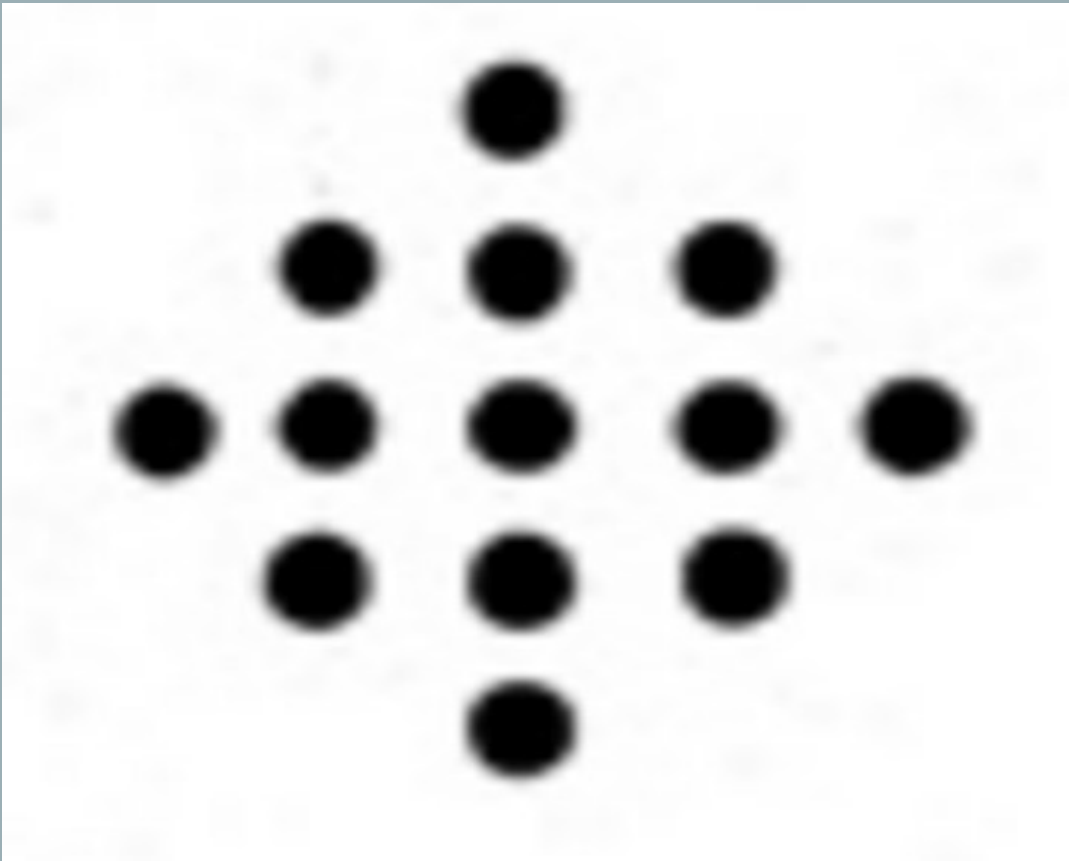
# CLASSROOM PROCEDURES & STRUCTURES

- 3) Thoughtfully structure collaboration.
  - Sit in groups not rows!
  - “Low-floor high-ceiling” tasks
  - Assign roles
  - Provide quiet think time before beginning
  - Valuing questions as much as answers

# MATH TALK

Count the dots  
on the next slide.





HOW MANY DOTS?

# ASSESSMENT & GRADING

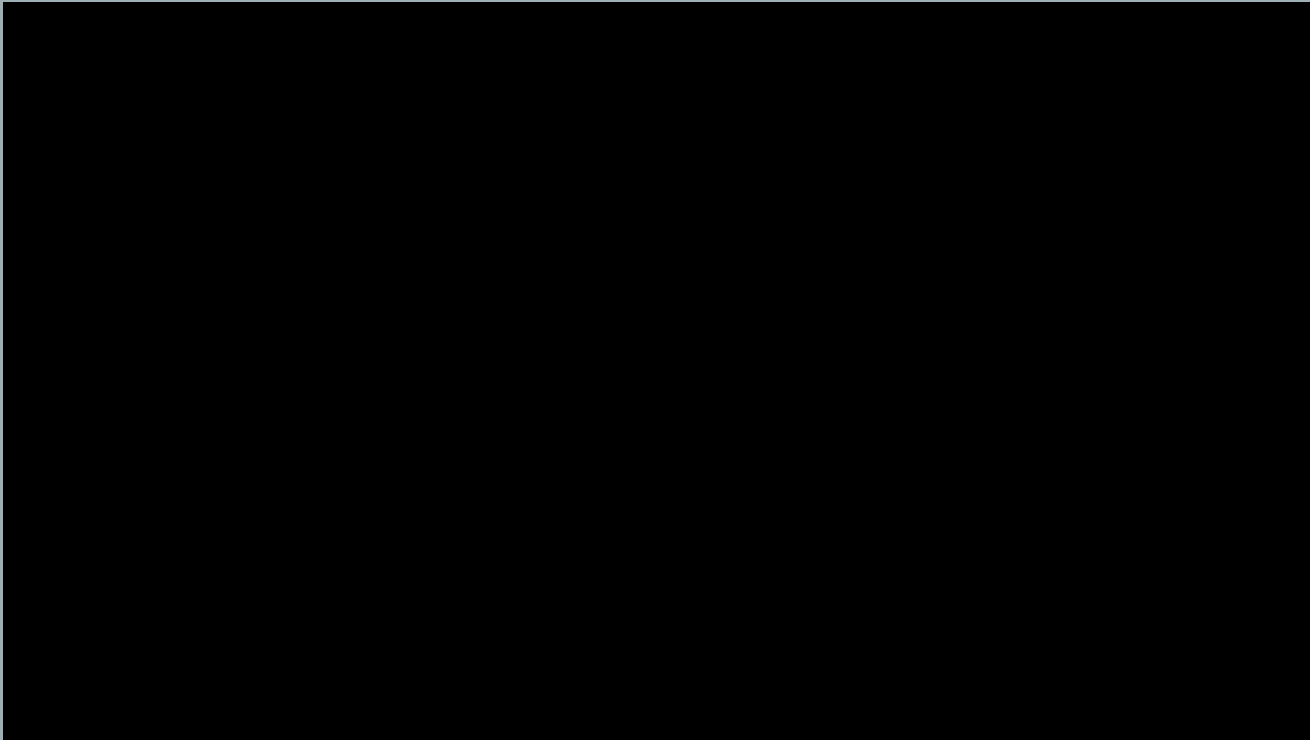
- I) Assessment should always be formative.
- Grades are *fixed* mindset messages!
- If something is graded for accuracy, opportunities for reassessment and revision should be provided.
- Written comments are more impactful than letter grades, scores, or percents.
  - Even when given less frequently!
- Language of grading should be focused on *mastery*.

# ASSESSMENT & GRADING

## 2) How students demonstrate mastery

- Deemphasize the weight independent skill-based assessments for accuracy have in students' cumulative grades.
- Self- and peer-assessment of mastery
- Alternative forms of assessment
- Recognize challenging collaborative activities and tasks are more important for actual learning than algorithmic skill-based practice.
- Emphasize thoughtful discussion, justification, making connections, visual representations, collaboration, perseverance, etc.

IN STUDENTS' OWN WORDS



# QUESTIONS? COMMENTS?

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# RESOURCES & RECOMMENDED READINGS

- What's Math Got To Do With It?: How Teachers and Parents Can Transform Mathematics Learning and Inspire Success by Dr. Jo Boaler
- Mindset by Dr. Carol Dweck
- Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching by Dr. Jo Boaler (Foreword by Dr. Carol Dweck)
- Designing Groupwork: Strategies for the Heterogenous Classroom by Elizabeth G. Cohen
- Nurture Shock by Po Bronson & Ashley Merryman
- The Gift of Failure: How the Best Parents Learn to Let Go So Their Children Can Succeed by Jessica Lahey
- Math Power: How to Help Your Child Love Math, Even If You Don't by Patricia Kenschaft
- Fermat's Enigma: The Epic Quest to Solve the World's Greatest Mathematical Problem: by Simon Singh
- Grit: The New Science of What it Takes to Persevere, Flourish, Succeed by Dr. Paul Stoltz
- Top Dog: The Science of Winning and Losing by Po Bronson & Ashley Merryman
- Outliers: The Story of Success by Malcolm Gladwell
- David and Goliath: Underdogs, Misfits, and the Art of Battling Giants by Malcolm Gladwell