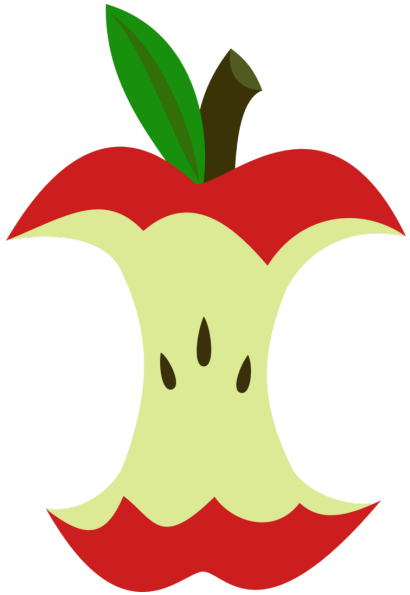
The Struggle for ALL is Real for ALL

Kansas Association of Teachers of Mathematics

Kansas College and Career Ready Standards For Mathematics



Chris Shore
The Math Projects Journal
Temecula Valley USD, CA

shore@mathprojects.com
mathprojects.com/presentations

@MathProjects
#KATM16
#thestruggleisreal

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What is Your Million-Dollar Talent?

The Struggle for ALL is Real for ALL

The Struggle to …

understand the Why

know the What

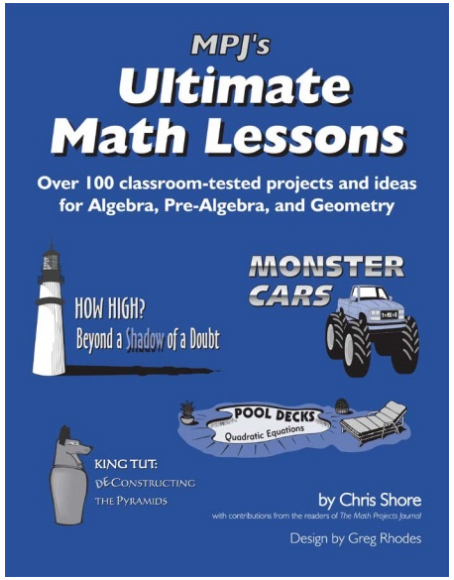
and do the How

Understanding the Why

$$6 + 4 + 4 + 8 = 21$$

Understanding the Why

The Common Core has been around long before they called it the Common Core.



Understanding the Why

COMMON CORE
STATE STANDARDS INITIATIVE

Teach students to THINK and COMMUNICATE their thinking.

These are the **21st Century Skills**.

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Understanding the Why

Understanding the Why

Think & Communicate

are the 21st Century Skills.

Obtain & Retain

were the 20th Century Skills.

The 6 Shifts

engage ny

We are redefining RIGOR.

Shift 1	Focus	Teachers significantly narrow and deepen the scope of how time and energy is spent in the math classroom. They do so in order to focus deeply on only the concepts that are prioritized in the standards.
Shift 2	Coherence	Principals and teachers carefully connect the learning within and across grades so that students can build new understanding onto foundations built in previous years.
Shift 3	Fluency	Students are expected to have speed and accuracy with simple calculations; teachers structure class time and/or homework time for students to memorize, through repetition, core functions.
Shift 4	Deep Understanding	Students deeply understand and can operate easily within a math concept before moving on. They learn more than the trick to get the answer right. They learn the math.
Shift 5	Application	Students are expected to use math and choose the appropriate concept for application even when they are not prompted to do so.
Shift 6	Dual Intensity	Students are practicing and understanding. There is more than a balance between these two things in the classroom – both are occurring with intensity.

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The 6 Shifts

engage ny

We are redefining RIGOR.

Understanding the Why

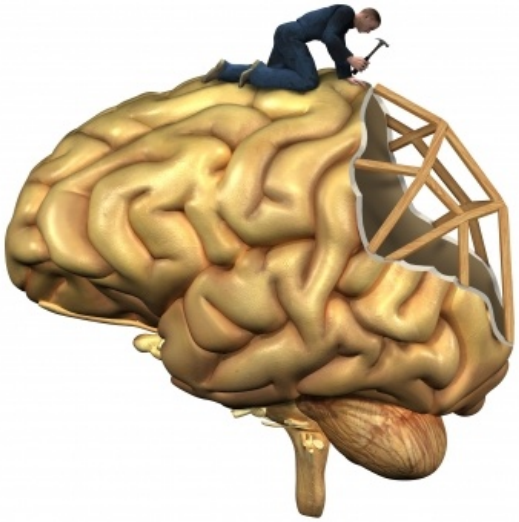
Think & Communicate

The 6 Shifts = The 21st Century Skills

The 4 C's

EdLeader21

We are redefining LEARNING and SCHOOL.



Critical Thinking

Communication

Collaboration

Creativity

60%

The 4 C's

EdLeader21

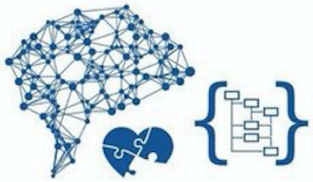
Our students' future is defining itself.

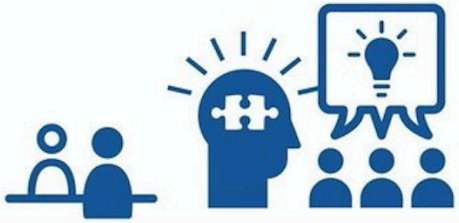
Top 10 skills

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

in 2020	in 2015
1. Complex Problem Solving	1. Complex Problem Solving
2. Critical Thinking	2. Coordinating with Others
3. Creativity	3. People Management
4. People Management	4. Critical Thinking
5. Coordinating with Others	5. Negotiation
6. Emotional Intelligence	6. Quality Control
7. Judgment and Decision Making	7. Service Orientation
8. Service Orientation	8. Judgment and Decision Making
9. Negotiation	9. Active Listening
10. Cognitive Flexibility	10. Creativity





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Understanding the Why

Think & Communicate

The 4 C's = The 21st Century Skills

The 4 Claims

We are redefining ASSESSMENT.

Concepts & Procedures

30-64%

Critical Thinking

Communicate Reasoning

Construct Models

Understanding the Why

Think & Communicate

The 4 Claims = The 21st Century Skills

The 8 Practices

The Practices are for the students.

COMMON CORE STATE STANDARDS INITIATIVE

Common Core Math is all about the Practices.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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Understanding the Why

Think & Communicate

The 8 Practices =

The 21st Century Skills

Understanding the Why

The 6 Shifts

+ The 4 C's

+ The 4 Claims

+ The 8 Practices

= The 21st Century Skills

Understanding the Why

$$6 + 4 + 4 + 8 = 21$$

Thinking and Communicating are the 21st Century Skills

Knowing the What

Mathematical Practices

1. Make sense of problems and persevere in solving them.
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Knowing the What

Make sense of problems and persevere in solving them. Mathematical Practice 1

When given a problem, I can make a plan to solve it and check my answer.

BEFORE...

Think about the problem.

THINK!

Make a **plan** to solve the problem.

DURING...

Don't give up!

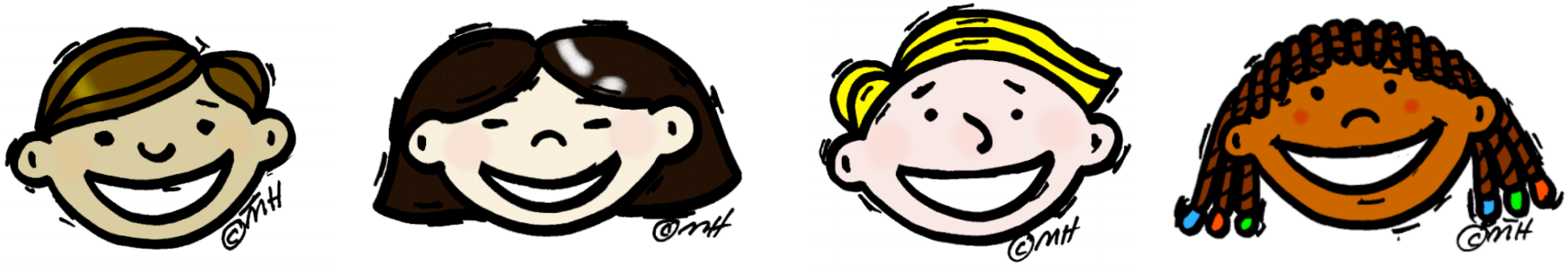
Does this make sense?

AFTER...

CHECK my work.

Is there another way to solve the problem?

Practices Posters



What did these posters teach you about the 8 Standards of Practice?

Knowing the What

Make Sense of Problems and Persevere in Solving Them

I can understand a problem, devise a strategy, execute a plan and evaluate it's success.

SOLVE

Organize

Strategize

Change Strategies

Evaluate

- Understand
- Plan
- Execute
- Check
- Repeat until successful.

What exactly is this problem asking of me?

What information do I have?

What information do I need and how do I get it?

What is the best plan?

Is my answer reasonable?

If not how should I change my strategy?

Think and don't give up.

The Math Projects Journal, 2014

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Practices Posters




What did these posters teach you about the 8 Standards of Practice?




COMMON CORE
STATE STANDARDS INITIATIVE

How many of the

8 SMP

do you remember?

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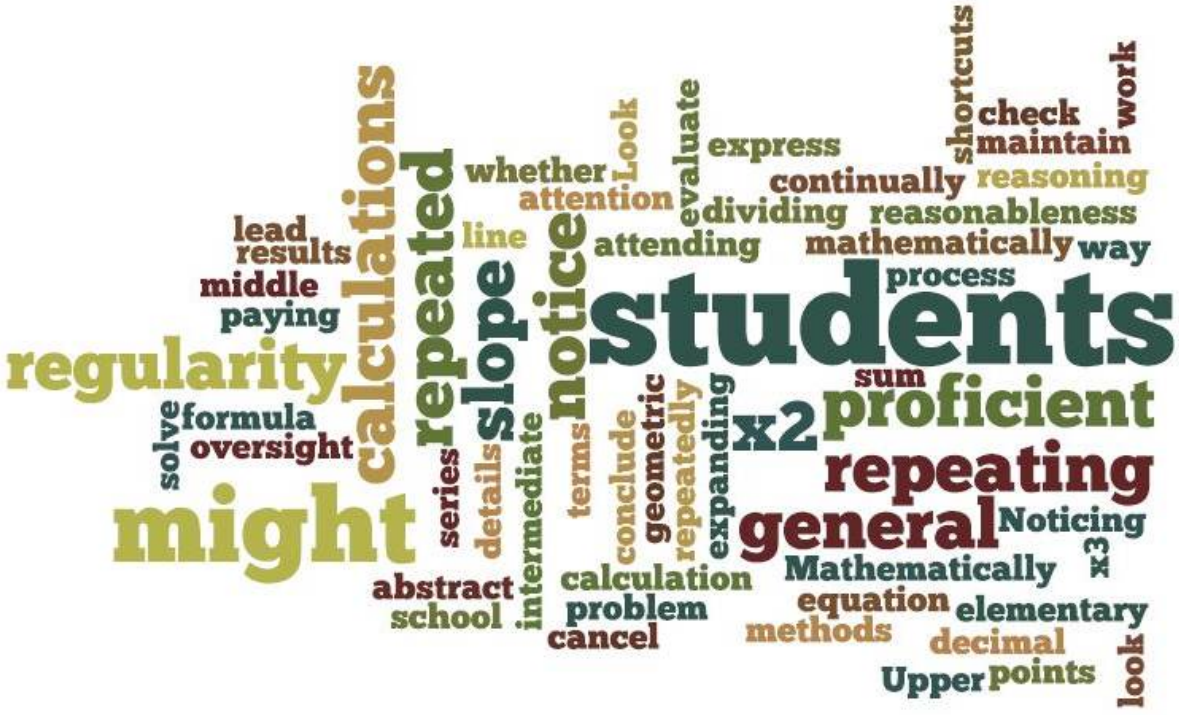
Wordle Practices

Match the *Wordle* poster to its corresponding CC Standard of Mathematical Practice?



COMMON CORE
STATE STANDARDS INITIATIVE

Mathematical Practices

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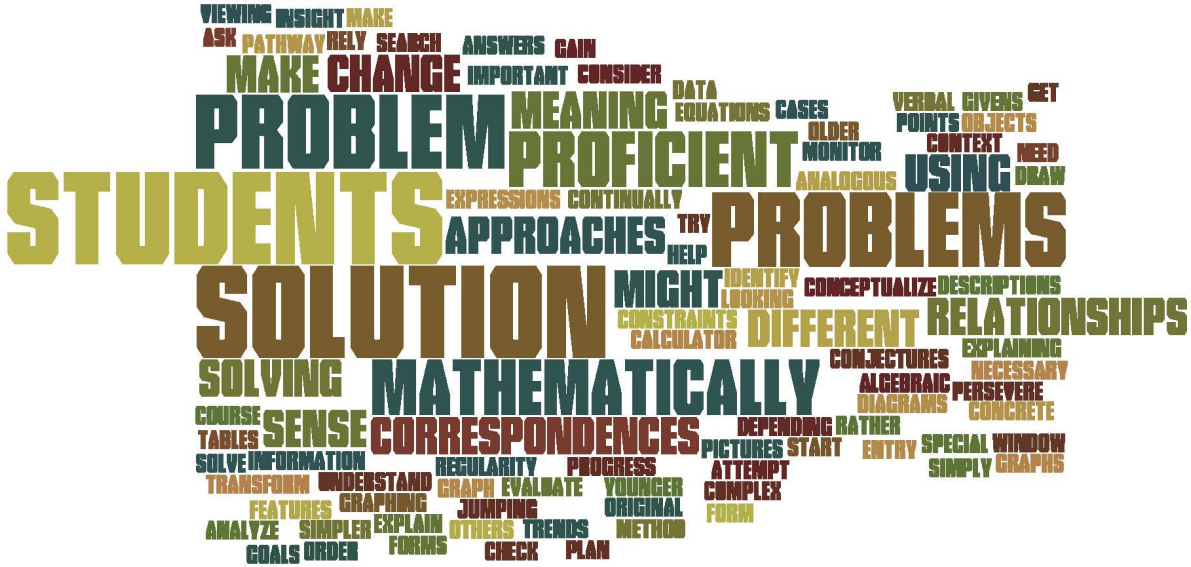
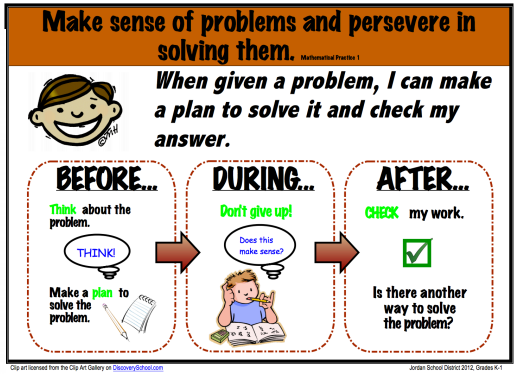
Wordle Practices



What Does This Say About Your New Job Description?



Mathematical Practices

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7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Knowing the What

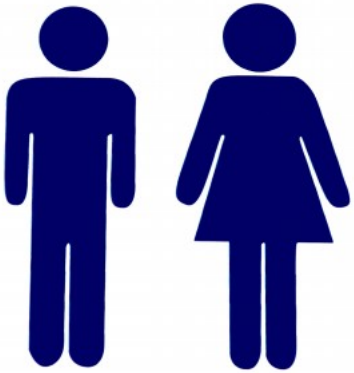
"This change requires a different style of instruction than what many have come to call 'sit and get.'

… teachers will have to encourage much more student work and student discourse and engage in far less teacher talk."

by Achieve the Core

Our Job Description has Changed

Break



10 minutes, until...

we see the How.

Doing the How

We need…

Brain Surgery (a Paradigm Shift)

They need…

No-Options Engagement

Boot Camp Numeracy

H.O.T.S.

The Paradigm Shift

"Students are solely responsible."

Coach's Mind Set

Emotional Investment

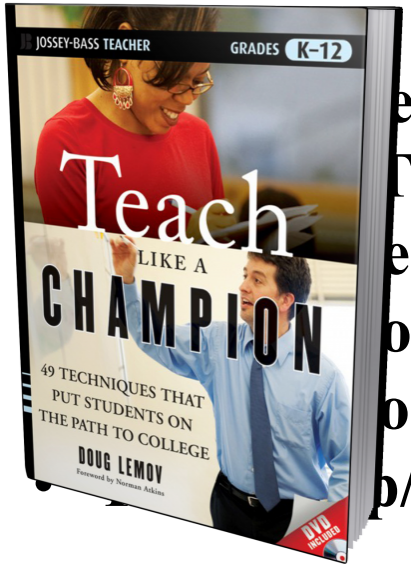
No-Options Engagement

The most loving thing you can do for your students is …

Demand Their Best Effort

No-Options

(Make failure more painful than success)



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Engage

(No Quiet Deals)

- Int ssons
- W
- Ca
- W
- Ex
- Pa

No-Options Engagement

❖**No-Options Strategies**

- Ticket out the door
- Non-stop harassment
- HW Detention
- Phone Calls/Email
- Supplemental Assignments

❖**Engagement Strategies**

- I do/we do/you do
- Chunking
- Stand & Point
- Use Student Response
- Wait for 100% involvement
- Thumb/Finger Votes
- Sticky Note Terror
- Participation Paraphernalia

(Beads, Raffle Tickets, Initials, Deck of Cards, Seating Chart Dots, Equity Sticks)

Boot Camp Numeracy

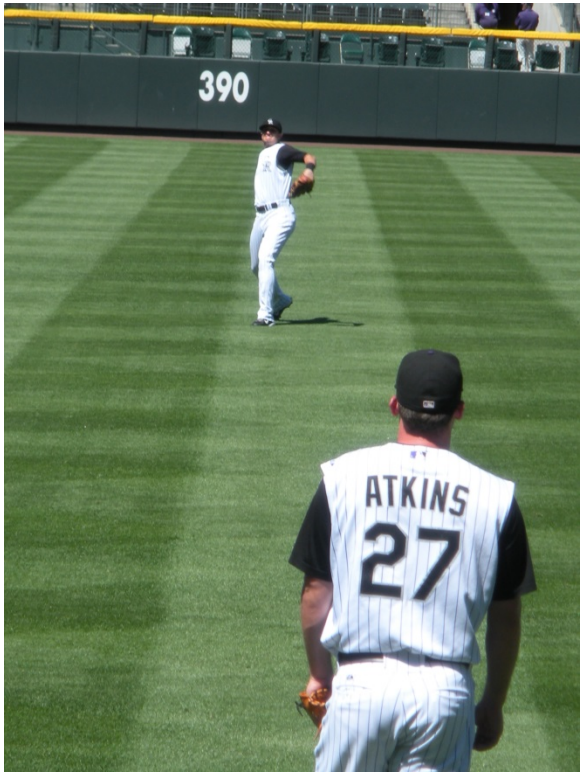
Refresh, Refine & Accelerate …

pre-requisite skills ...

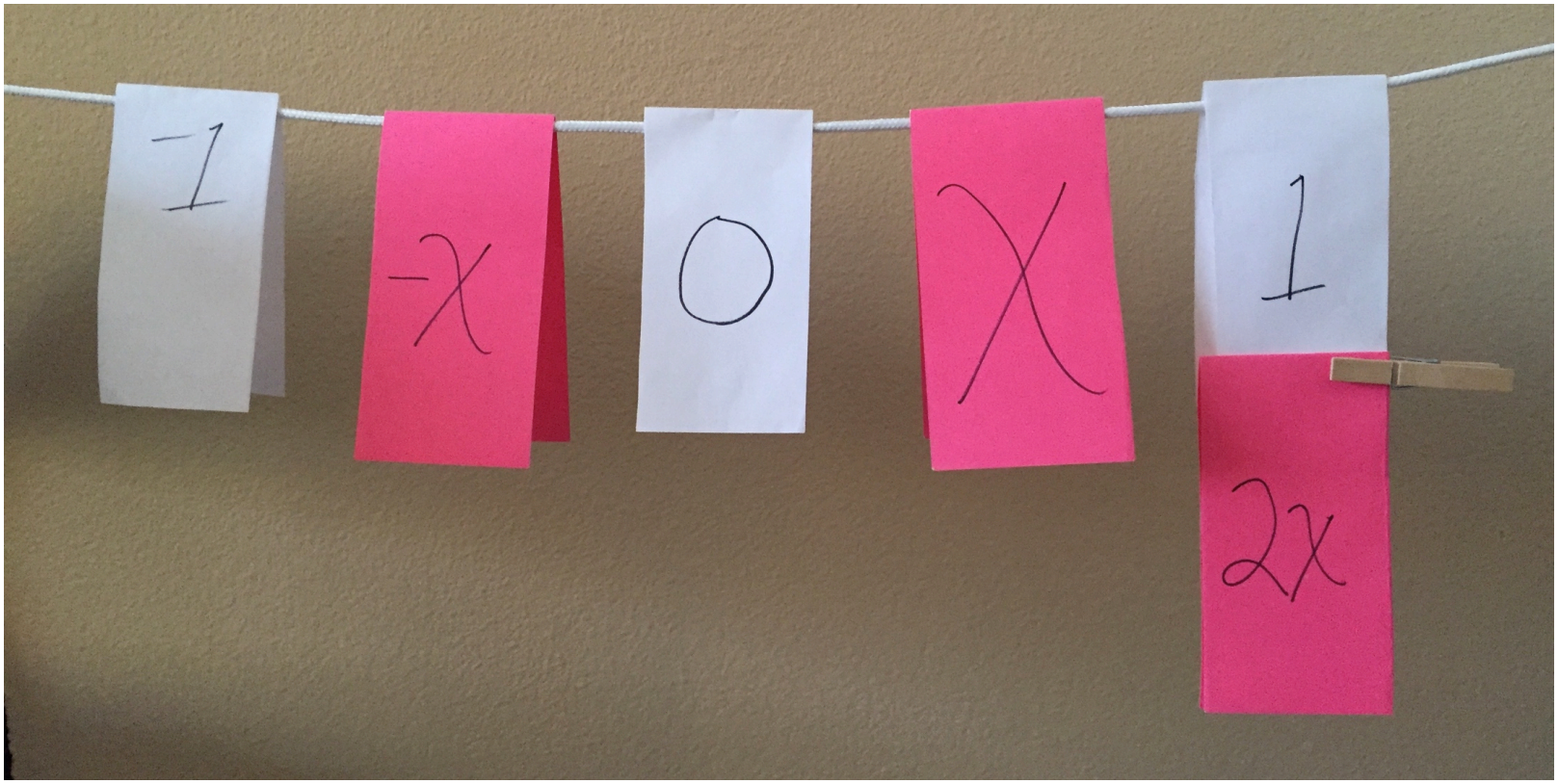
before each lesson, week or unit.

Fundamentals are Key …

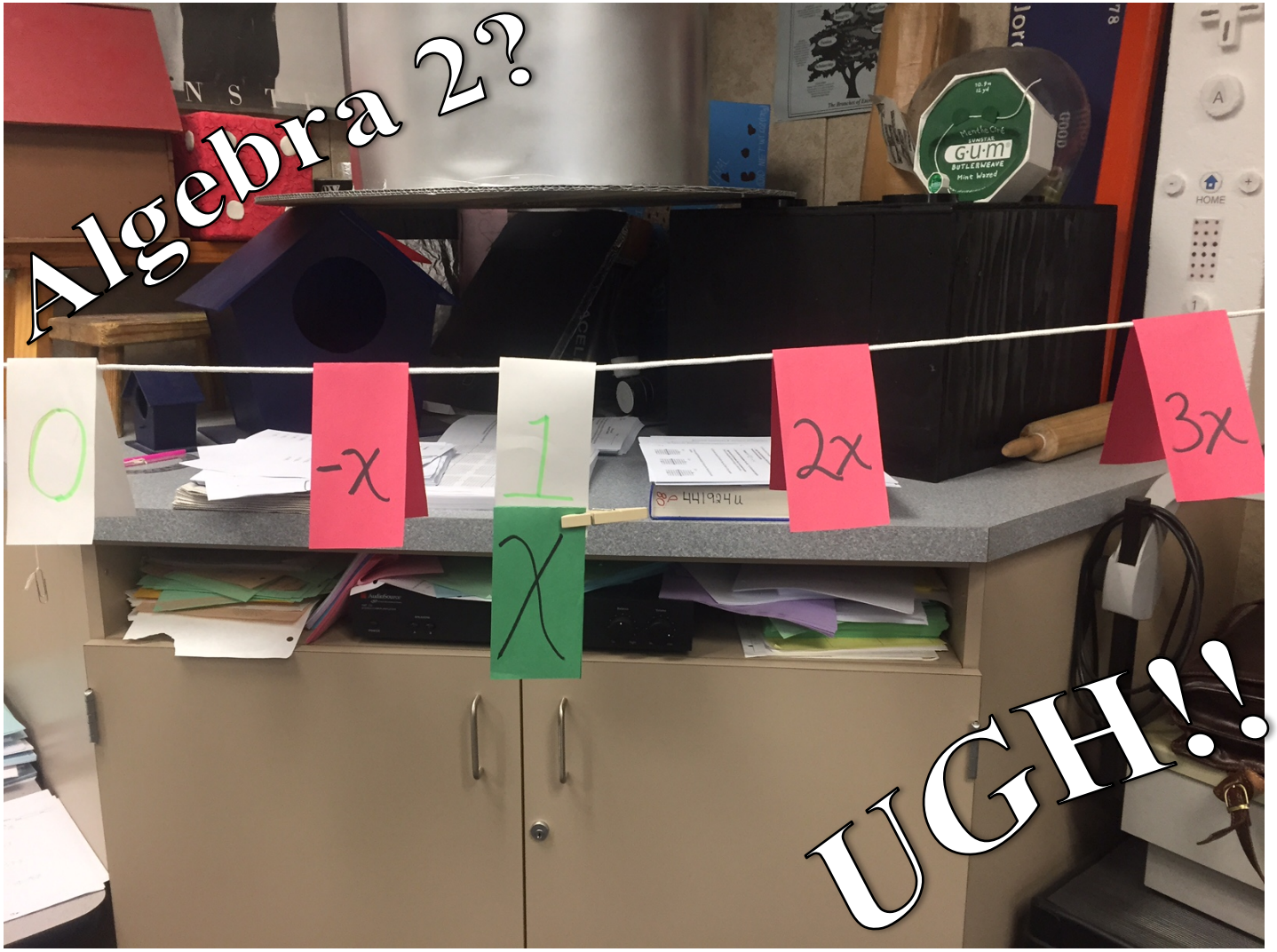
… and need to be practiced regularly!



clotheslinemath.com



Clothesline



Boot Camp Intervention

Case Study:

Algebra Team Pre-Assessed w/ Textbook Resources: 15% Failed

3-Day, 20-Min Intervention, then Post Test: 85% of those Passed

Acceleration = Extra Work

Double Up?

What are your pre-req's?

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Explicit Teaching of Thinking

HOTS

Dr. John Star

"Math does not teach Problem Solving."

"Only the explicit teaching of thinking teaches thinking."

Defining Problem Solving

Exercise

Problem

Don't Know How
Don't Have the Ability

Crisis

Re-Orientation: This is the How!

Notes-Oriented → **Task-Oriented**

30% ***Dual Targets*** **70%**

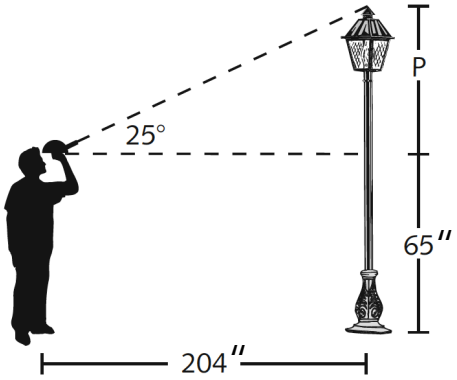
Content* and *Practice

Daily!

Doing the How

"not quit"

Target: We will persevere in solving problems with trigonometry.



Use Ratios
Substitute
Plot Points
Use Formulas
Test Assumptions
Write an Equations
Guess-n-Check
Measure

Common Sense
Fight the Gravity Storm
Use Tools
Reverse the Steps
Draw
Use Properties
Teamwork
Wrestle the Bear

Doing the How

What is a Task?

70%

30%

"A *mathematical task* is a problem or set of problems that focuses students' attention on a particular mathematical idea and/or provides an opportunity to develop or use a particular mathematical habit of mind."

-- Adding it up (2001)

8 Practices

MPJ

Doing the How

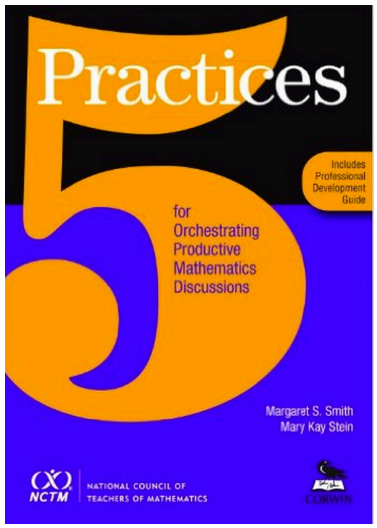
What is a Task?

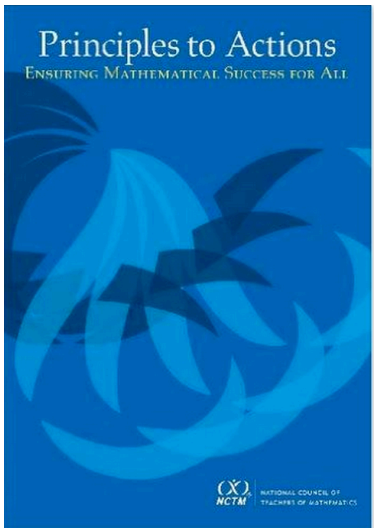
"a problem that provides an opportunity to develop mathematical ideas and [thinking]."

-- Adding it up (2001)

Tasks = Problems used to teach Content & Practices

Doing the How





Dr. Peg Smith

"It's all about the task.

It's all about the task.

It's all about the task."

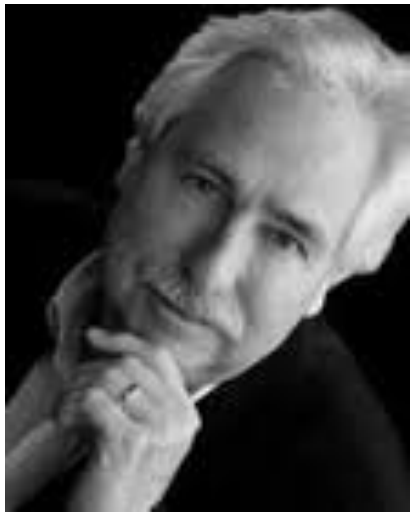
Tasks Are For Whom?

"Accelerated" Remedial Math Students with Rich & Robust Tasks

Dr. Uri Treisman

ALL Kids!

Dave Foster



50% False Positives
Among 8th Grade Geometry
From CST to SBAC

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Doing the How

Kansas State Performance Tasks

Grade 4 Operational Mathematics Performance Task 2016

Mr. Green's class is using different activities to study the environment. He placed his students into groups that are making posters, recycling cans, and planting trees. The chart shows how the students are divided into groups.

Activity	Fraction of Class
Making posters	$\frac{5}{12}$
Recycling cans	$\frac{1}{4}$
Planting trees	$\frac{1}{3}$

1. Order the groups from least to greatest number of students, starting with the least number on the left.

making posters | recycling cans | planting trees

2. The class has 24 students. How many students are in the group that is making posters?

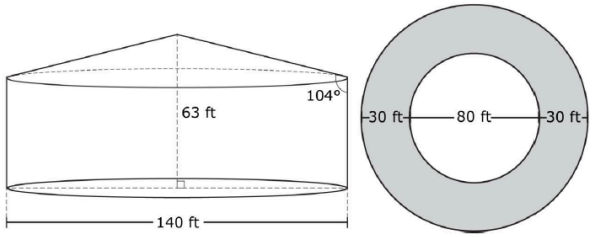
3. The group making posters has a roll of paper that is 119 inches (in.) long. The group makes 6 posters of equal length and makes the largest posters possible with whole number side lengths. What is the length of each poster?

Doing the How

Kansas State Performance Tasks

Grade 10 Example Mathematics Performance Task 2016

A circus tent is composed of a cylinder with a diameter of 140 feet (ft) topped by a cone of the same diameter, as shown. The height of the tent at its highest point is 63 ft. The visitors at the circus stand in the outer area of the base. The base of the tent, showing the visitor area with shading, is shown from above.



1. How tall is the conical portion of the tent? Write your answer, and explain how you found it.

2. What is the volume of the tent? Write your answer, and show your work.

3. Without doing the calculations to find the surface area of the tent, explain how to find its surface area. Either write an equation, or describe the process in words.

4. The tent holds 1,700 visitors. How many square feet (ft^2) of space does each visitor have in a full tent? Write your answer, and explain how you found it.

5. The number of tickets, t, that the circus sells is dependent on the price, p, in dollars. The relationship can be modeled by the equation $t = 1700 - 100p$. At what ticket price p will the circus make the most money?

Doing the How

The Paradigm Shift

No-Options Engagement

Boot Camp Numeracy

H.O.T.S.

The Take-Aways

Why

The Common Core is all about teaching students to *think & communicate*,

What

so our *job description* has changed

How

to the *No-Options* engagement with *H.O.T.S.* & *Numeracy* through *tasks* for *ALL* students.

Call to Action

Fail Grandly

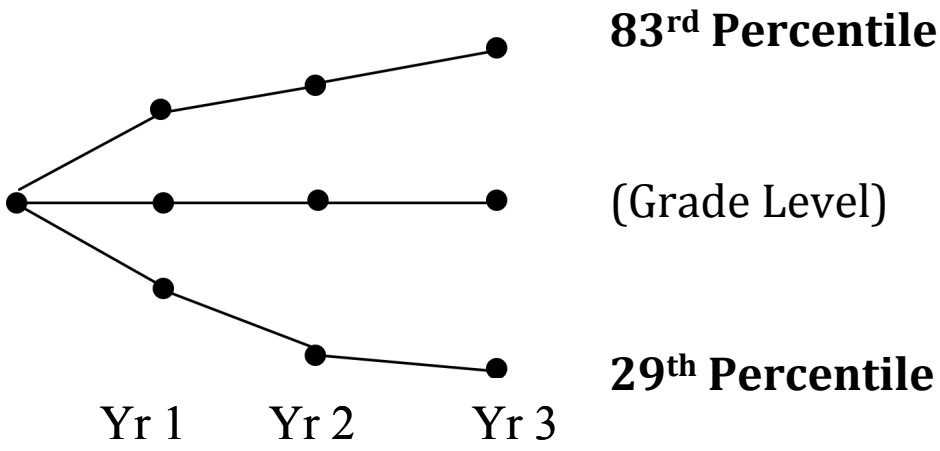
No Real Risk

2-Week Rule

Teacher Action is the Difference

"The greatest influence in the quality of the education that a student receives is the decisions that a teacher makes on a daily basis."

-- Dr. William Schmidt, University of Michigan



Teacher Action is the Difference

Teachers matter most.

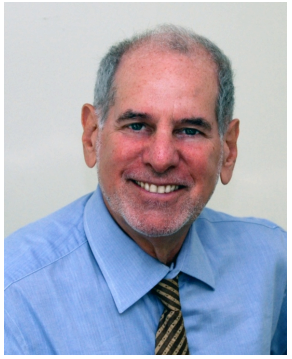
-- Dr. William Schmidt, University of Michigan

Teachers matter most.

-- Peg Smith, University of Pittsburgh

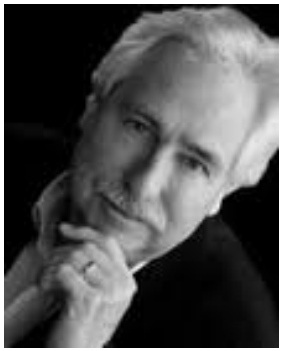
Teachers matter most.

-- Tim Kanold, Adlai E. Stevenson HS, Chicago



Poverty matters … a lot.

-- Dr. Uri Treismen, University of Texas, Austin



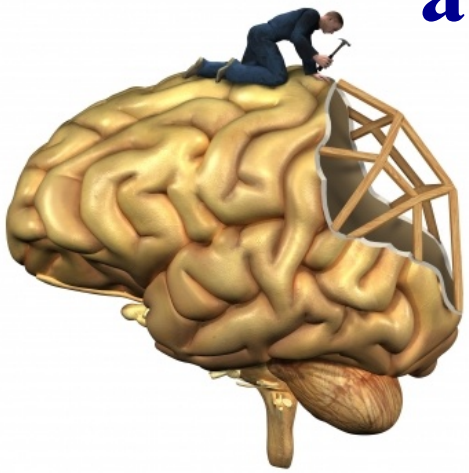
Teachers matter most.

-- David Foster, Silicon Valley Math Initiative, CA

MPJ

Teach students to *think* & *communicate* …

…with the faith that they can learn it, and that we can teach it to them,



because they are that smart, and we are that good,

and because what we do matters the most.