Building *Your* 21st Century Math Program

E
X
C
E
L

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Day 2

MPJ

Building *Your* 21st Century Math Program

Recap QUIZ

1) On Your Own from Memory
2) Refer to Notes
3) Work with Partners

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Recap Quiz

E **Enhance** learning through innovation

X **Excellence** in academics

C **Collaborative** community and parent involvement

E **Equality** through equity

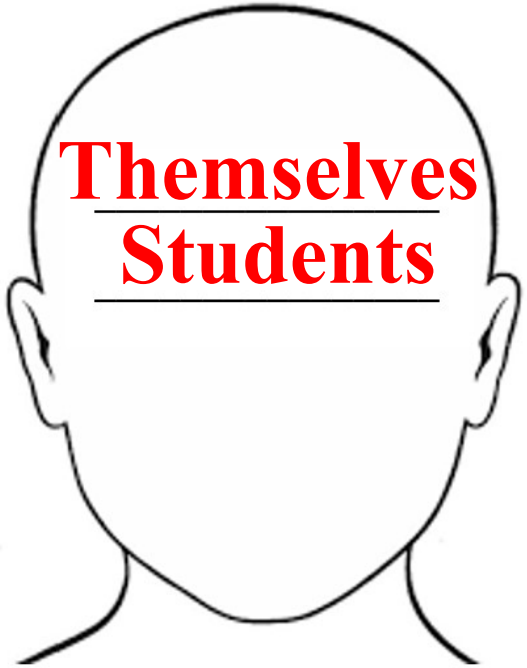
L **Learning** in safe and secure environments

Building *Your* 21st Century Math Program

Recap Quiz

Student must believe in…

Teacher must believe in…



#1 Effect Size is Collective Teacher Efficacy

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Recap Quiz

#1 Students don't improve until Teachers Improve

#2 Teachers don't improve until Leaders Improve.

#3 Our Systems are getting the exact results that they were designed to get .

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Recap Quiz

The **4 Smarter Balance (SBAC) Claims** are:

1 C oncepts & P rocedures

2 P roblem S olving

3 C ommunicate R easoning

4 M odeling & D ata A nalysis

Building *Your* 21st Century Math Program

Recap Quiz

- The 21st Century College and Career Readiness Standards are summarized by teaching students to Think & Communicate.

- The Four C's: Critical Thinking
  Communication
  Collaboration
  Creativity

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Recap Quiz

The 8 Math Practices are:

1. S olve
2. R eason
3. Argue
4. Model
5. T ools
6. P recision
7. S tructure
8. P atterns

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Recap Quiz

D.O.K. Levels:

1: Recall & Reproduction

2: Skill & Concept

3: Strategic Thinking

4: Extended Thinking

Building *Your* 21st Century Math Program

Recap Quiz

PLC Questions #1:

What do we want students to learn and be able to do?

What have you implemented?

Share out in your groups

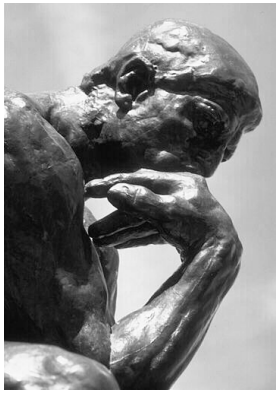
What is Your Walk Out Song?

Our Norms

- **Advance the Vision**
- **All Voices**
- **Be Present**
- **(Consensus, not Compromise)**

Your 21st Century Math Program

Our 3 Days

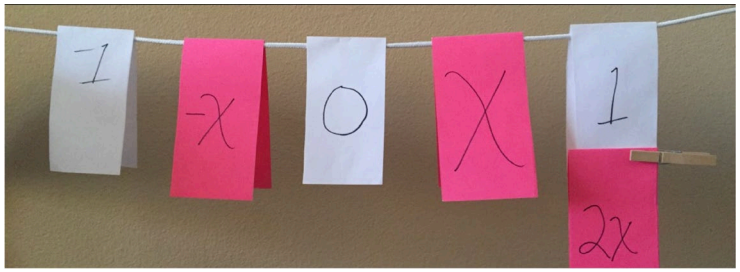


Question #1

Nov 1

Question #2

Feb 4



Questions #3 & 4

May 21

Your 21st Century Math Program
Our Goals Today

- **Model Lessons**
  Question #2, "E & C"

- **Teacher Moves**
  Question #2, "L"

- **PLC Structures**
  Question #2, "EXCEL"

Building *Your* 21st Century Math Program

ENHANCE learning through innovation

COLLABORATIVE
community and parent involvement

Your 21st Century Math Program

Model Lesson: Discourse & Formative Assessment

TOPIC 1

From Proportions to Linear Relationships

Where might you see the sign shown? What can you say about the triangle on the sign? What do you think 8% represents?

Lesson 1
Post-Secondary Proportions
Representations of Proportional Relationships M2-7

Lesson 2
Jack and Jill Went Up the Hill
Using Similar Triangles to Describe the Steepness of a Line M2-23

Lesson 3
Slippery Slopes
Exploring Slopes Using Similar Triangles M2-43

Lesson 4
Up, Down, and All Around
Transformations of Lines M2-53

We will determine slope from multiple data displays and justify our reasoning.

Your 21st Century Math Program

Model Lesson: Discourse & Formative Assessment

Algebra 1 **Name**_____

7% Grade

While driving, the road you are on begins to go downhill. At the top of the hill, you see this this warning sign.

1) What do you notice about the warning sign?

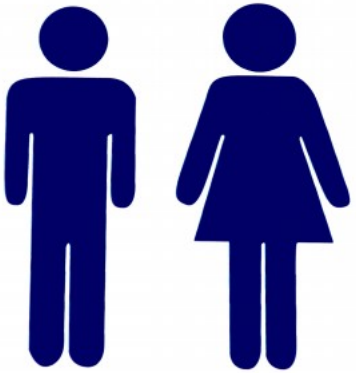
2) What do you wonder?

3) What is the mathematical slope of the triangle on the sign?

4) What is the true grade of the hill on the sign?

We will determine slope from multiple data displays and justify our reasoning.

Break



10 minutes, until...

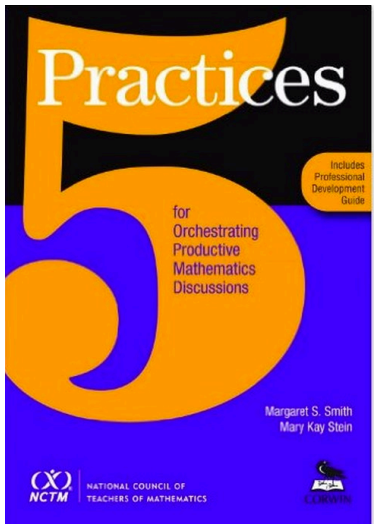
We Reach & Teach All Kids

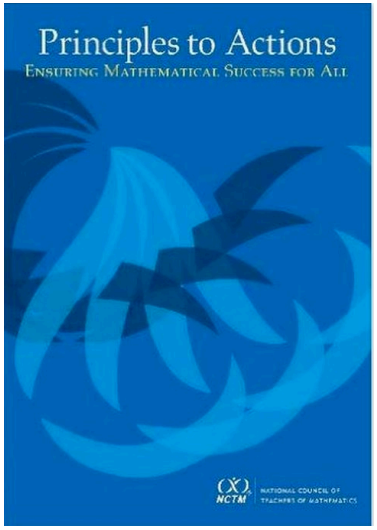
Building *Your* 21st Century Math Program

LEARNING in safe and secure environments

Your 21st Century Math Program

THE Math Discourse Protocol





Dr. Peg Smith

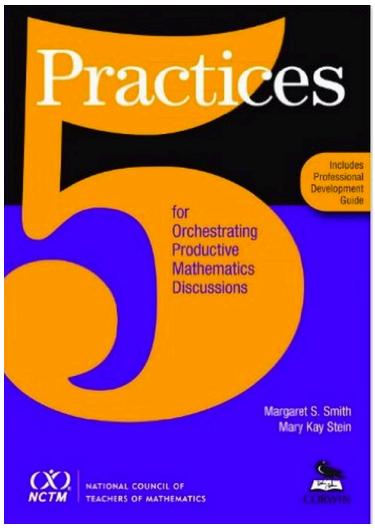
"It's all about the task.

It's all about the task.

It's all about the task."

Your 21st Century Math Program

THE Math Discourse Protocol



1) Anticipate
2) Monitor
3) Select
4) Sequence
5) Connect

Where were these 5 Practices seen in the "7% Grade" Lesson?

Reaching and Teaching
"Those Kids"

When You Reach ‘em …

Geometry: from 1st Progress to Semester Report Card (over 3 years)

12-15% » 0-9%

District Final improved over 3 years from 74% to 85% avg.

Algebra Essentials: 1st Progress to Semester Report Card (over 2 semesters)

33% » 9%

Remedial Math Class met the district average on Final Exam.

Algebra 1 At-Risk: from 8th Grade Math to Freshman Algebra

100% » 0-6%

Exceeded the district average on Final Exam.

Single Digit Failure Rates are Possible!

MPJ

How Do We Reach Them?

We need…

Brain Surgery. (a Paradigm Shift)

They need…

No-Options Engagement

Boot Camp Numeracy

HOTS

The Paradigm Shift

"Students are solely responsible."

Coach's & Parent'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)

- **Slacker Alert**
- **Entrance Ticket**
- **Incomplete Policy**
- **Student Conference**
- **Intervention**
- **HW Camp/Board-listed**

Engage

(No Quiet Deals)

- **Interesting Lessons**
- **Walk-abouts**
- **Call Outs**
- **Whiteboards**
- **Exit Ticket**
- **Pair/Share**

No-Options Engagement

❖**No-Options Strategies**

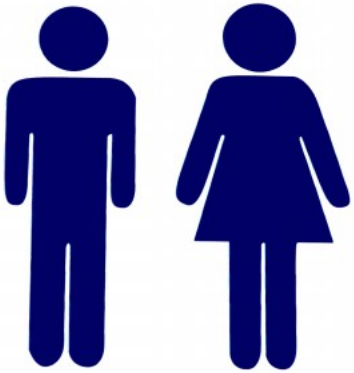
- Ticket out the door
- Non-stop harassment
- HW Detention
- Phone Calls/Email
- Supplemental Assignments

❖**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)

Break



10 minutes, until...

We Make Group Work… Work

No-Options Engagement

Ryan: What did you prove in class yesterday?

"I am actually intelligent."

Danielle: What was the great victory yesterday?

"I really can do math."

Danika: What did Mr. Shore ever do to you?

"Mr. Shore didn't say anything about my Mom, but I still don't think I did anything wrong."

Clemente: EL/SPED … 7 of 10

No-Options Engagement

Ms.Wither has implemented the “no exceptions” on homework. Do all your homework or don’t get a grade….
Today, there were 44 students working productively in her office hours. I told her good job and wow.

Her response,
(with amazement),
“I guess when you give them no option or they don’t get a grade kids do their work.”

Boot Camp Numeracy

Explicit Teaching of Thinking

HOTS

Dr. John Star

"Math does not teach Problem Solving."

"Only the explicit teaching of thinking teaches thinking."

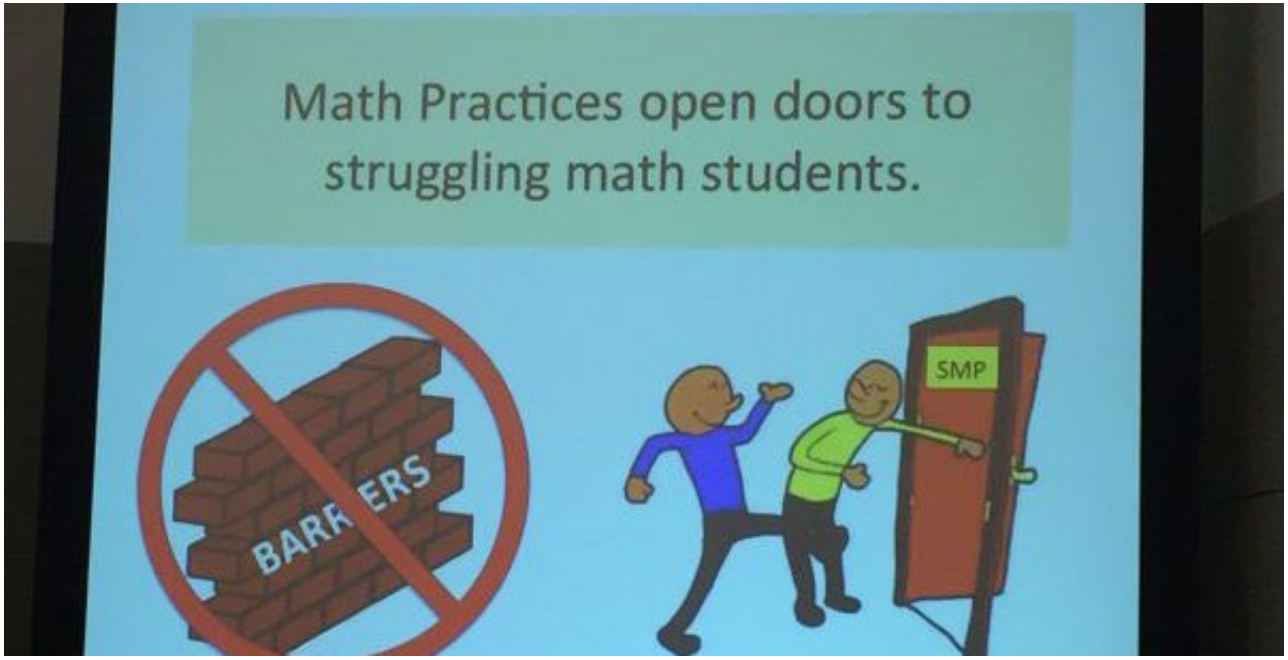
Re-Orientation

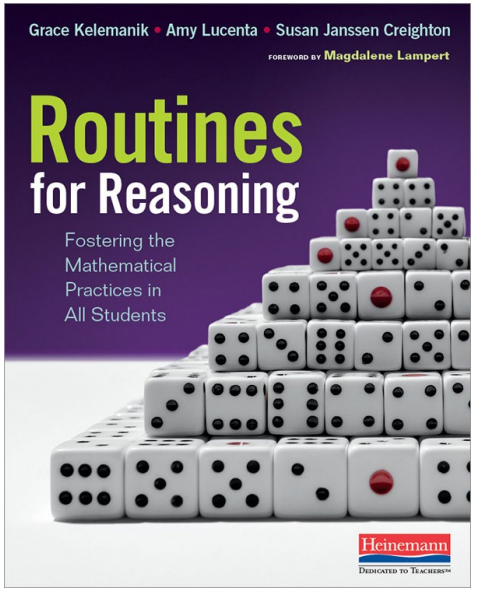
Notes-Oriented → **Task-Oriented**

40% ***Dual Objectives*** **60%**

most

H.O.T.S. Are For All Kids!





Amy Lucenta & Grace Kelemanik of the Boston Plan for Excellence, NCTM Boston, 2015

Declarations

Reaching & Teaching Those Kids

The Paradigm Shift ✓

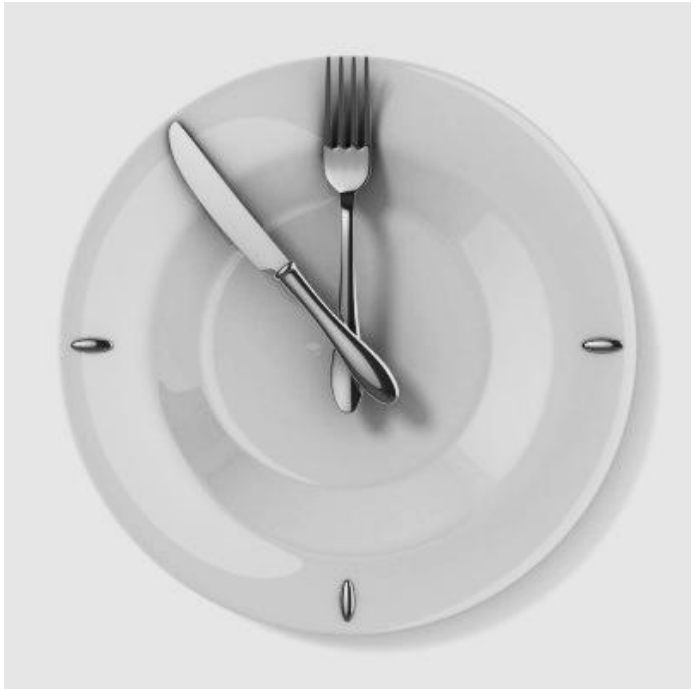
No-Options Engagement ✓

Boot Camp Numeracy COMING SOON!

H.O.T.S. ✓

With which can you start?

Lunch



Up next:

The Structures that will get the results to match your talents.

Building *Your* 21st Century Math Program

ENHANCE learning through innovation

EXCELLENCE in academics

COLLABORATIVE community and parent involvement

EQUALITY through equity

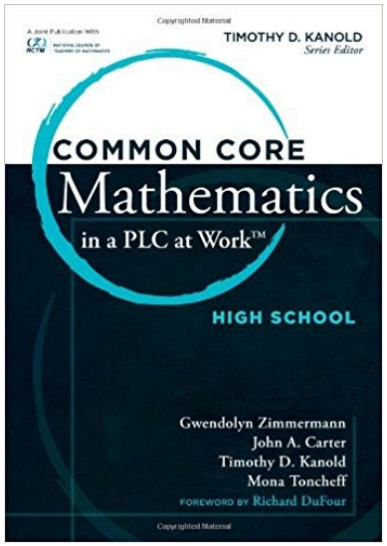
LEARNING in safe and secure environments

MPJ

PLC Booster

Systems & Structures

- Definition
- Vision
- Protocols
- The Four Questions



- No-Options Engagement
- Time
- Resources

Definition

"An ongoing process in which educators work collaboratively in recurring **cycles of collective inquiry** and action research to achieve better results for the students they serve. Professional learning communities operate under the assumption that the key to improved student learning is the job-embedded **learning for educators**."

How can you do a cycle of inquiry without common assessments?

Is your collaboration making you a better teacher?

The Four Questions

① **What do we want students to know and be able to do?**
(Standards & Expectations)

② **How will we know when they have learned it?**
(Common Assessments & Data/Evidence)

③ **What will we do when they haven't learned it?**
(Intervention)

④ **What will we do when they already know it?**
(Extended Learning)

What Do Grades Tell Us?

Log into Aeries

Answer to yourself:

1)What is your D/F rate?

2)What percentage of students are within striking distance? (≥ 65%)

3)What would D/F rate be if your students had a 100% gradebook?

Any Revelations?

Protocols

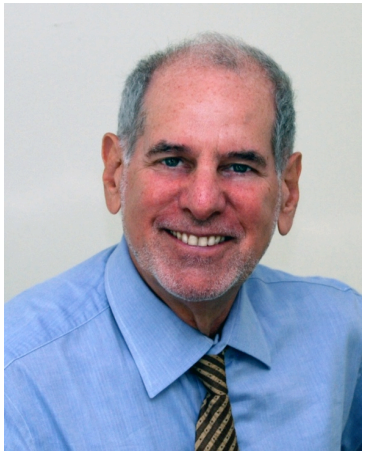
How will you know when they know it?

Attach a Name to a Need

How well is your site equipped to collect & analyze data?

Protocols

What is working in high-performing, low-income schools?



- 'Protocol Driven' Department Meetings
- Common Assessments
- Structures for looking at Student Work
- PD Organized around Curriculum
- Credit Recovery Structures

-- Uri Treisman

What protocols is your site implementing?

Time

Weekly Collaboration
Periodic Release Days
Occasional After-School Meetings

What is your site doing to Find & Protect Time?

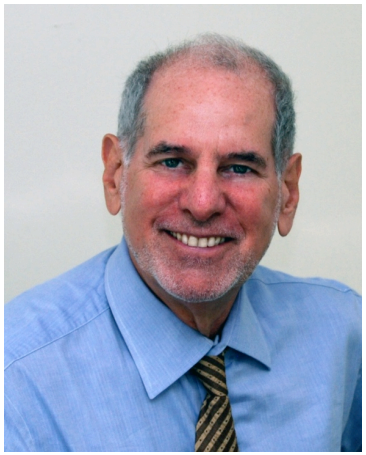
No-Options Engagement

CREATIVE
LEADERSHIP
SOLUTIONS

"The appropriate consequence for failing to complete the assignment is to require the student to complete the assignment."

-- Doug Reeves

No-Options Engagement



To what degree does your site demand student excellence versus permit mediocrity?

Resources

The Story of Linfield's Campaign to Encourage Group Work

What 21st Century resources are available to Redlands teachers?

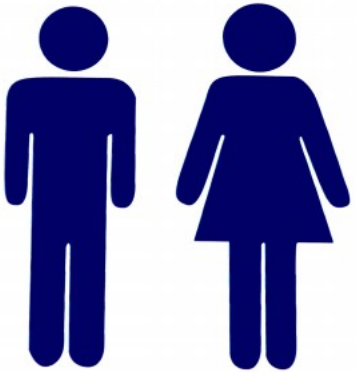
Building *Your* 21st Century Math Program

ENHANCE learning through innovation

COLLABORATIVE community and parent involvement

Pig Pen & 3-Read

Break



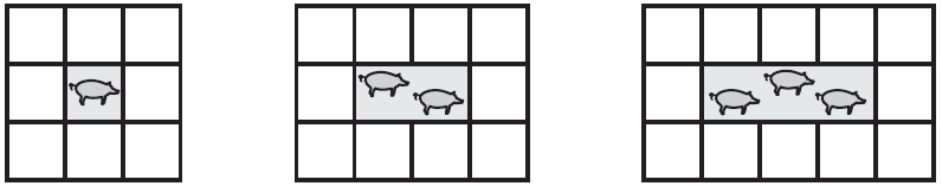
10 minutes, until...

wallow in the Pig Pen.

Pig Pen

Pig Pen Algebra

Farmer John is making a pig pen. He is short on materials so he is making the pen out of bales of hay. These bales are shaped as cubes. Farmer John likes to keep things simple, so whenever he gets another pig, he just extends the pen as shown below. Your job is to help Farmer John write a formula to tell him how many bales of hay he will need for a given number of pigs.



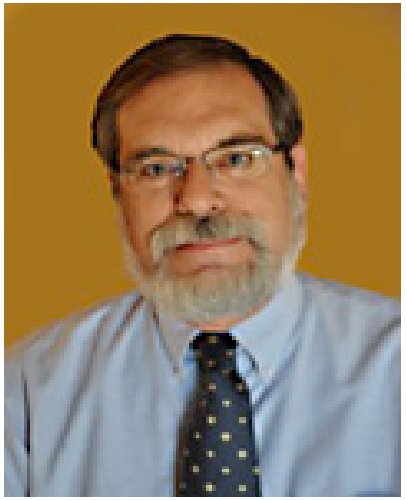
Your 21st Century Math Program
Our Goals Today

- **Model Lessons**
  Question #2, "E & C"

- **Teacher Moves**
  Question #2, "L"

- **PLC Structures**
  Question #2, "EXCEL"

Your 21st Century Math Program
Call to Action

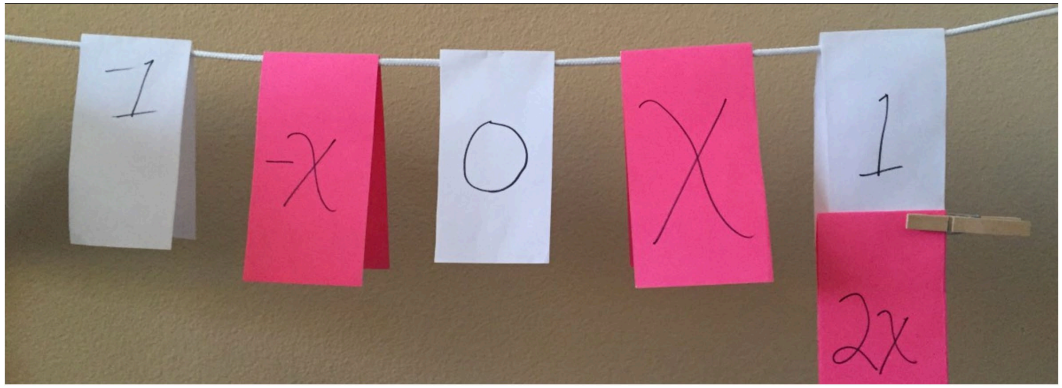


10%

2-Week Rule

Your 21st Century Math Program

Our Next Day



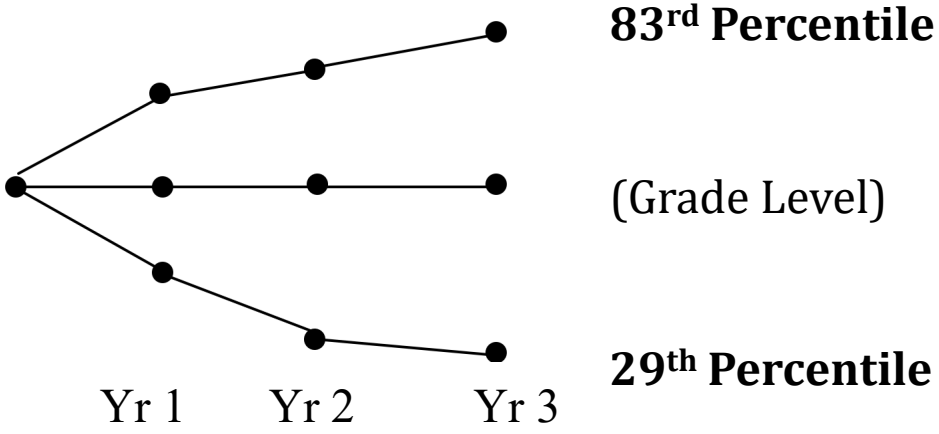
Questions #3 & 4

May 21

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



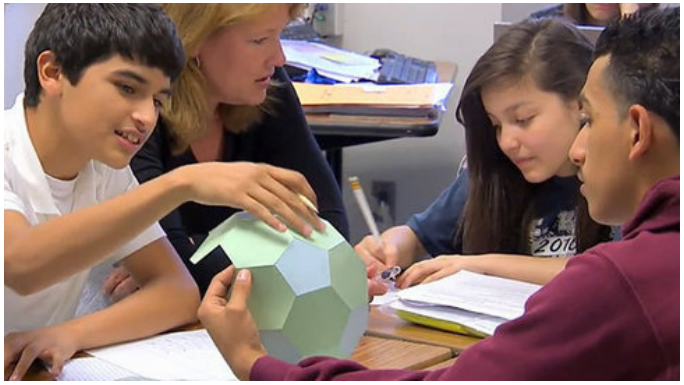
Build *Your* 21st Century Math Program…

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

…so you can change this world one math lesson at a time.

Making Group Work Work with Less Work

In Principle…



- Why Group?
- Which Group Structures?
- How to Manage Groups?
- When to Group?

In Practice…

The Zipline Task

Group Work
To Group or not to Group?

The 4C's:

Critical Thinking, Communication, Collaboration, Creativity

Top 10 skills

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

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Group Work
To Group or not to Group?

- Higher-Level thinking, Oral Communication, Self-Management, and Leadership Skills.
- Student-Faculty interaction.
- Retention and Responsibility.
- Diverse perspectives.
- Preparation for real life social and employment situations.

(from Cornell University Center of Teaching Excellence)

Group Work
To Group or not to Group?

"Active Learning is the empirically validated teaching practice in regular classrooms,"

Active learning is defined as "engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work."

--National Academy of Sciences, Scott Freeman, 2013

Group Work
To Group or not to Group?

"Failure rates under traditional lecture are 55 percent higher than the rates observed under more active approaches to instruction."

– Mathematics Association of America, 2015

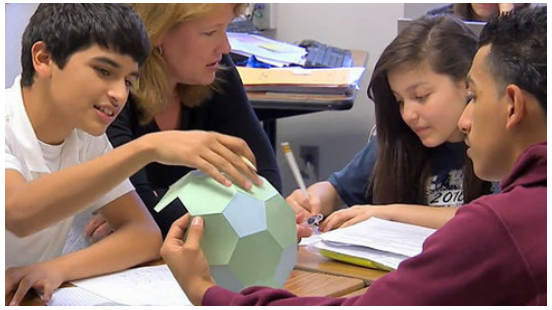
Group Work
To Group or not to Group?

"Some of the findings, such as the benefits of student engagement, are unlikely to be controversial although the magnitude of improvements resulting from active-engagement methods may come as a surprise Other findings challenge traditional assumptions […] For example, students will remember more content if brief activities are introduced to the lecture."

– Journal of Engineering Education, 2004

Group Work
To Group or not to Group?

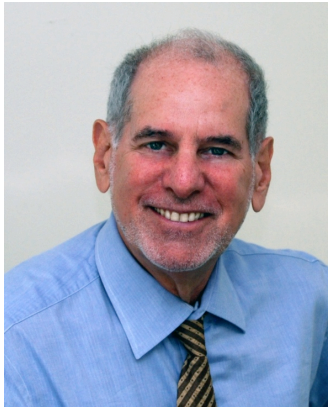
Research & the 4 C's



claim that *collaboration* is a means AND an end!

Group Work
Which Group Structures?

Task = Group Worthy



Homogenous

Heterogeneous

Random

A Note About Group-Worthy Tasks

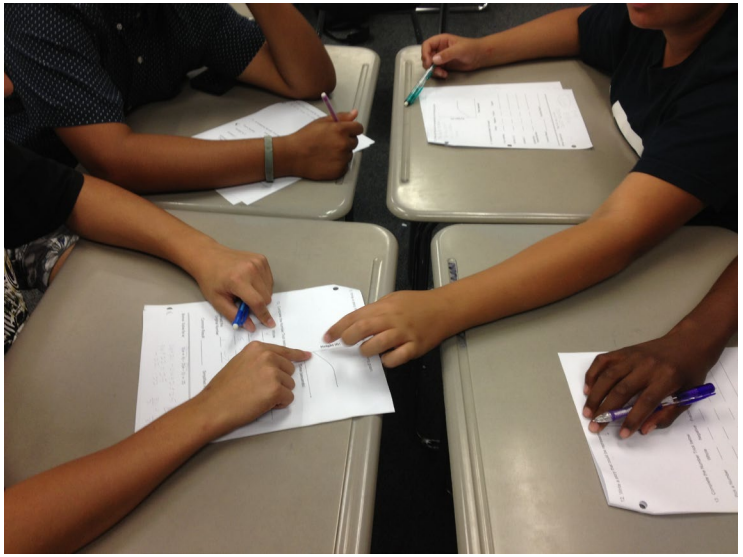
"If you have a **procedural** textbook, not only is **there nothing to collaborate about**, the 'smart kid' in the group is always the one who gets the computation right," said Lizzy Hull Barnes, the mathematics supervisor for the San Francisco district. But when students **wrestle over problems together**, they can use different methods, compare approaches, and figure out why some work and others don't, making all of them **active participants** in the learning, she said.

Education Weekly, Nov, 2018,

Group Work
How to Manage Groups?

Norms

Vigilance



Accountability

Group Work
How to Manage Groups?

1. I will explain my thinking.
2. I will listen to thinking of others
3. I will say something if I don't understand or agree.

4 …?

Group Work
When to Group?

Notes-Oriented → **Task-Oriented**

40% **60%**

Start with 1 task per unit.

Making Group Work Work with Less Work

In Principle…

- Why Group?

  Research, & Four C's
- Which Group Structures?

  Heterogeneous, Homogeneous, Random,
- How to Manage Groups?

  Norms , Vigilance , Accountability
- When to Group?

  Most of the time

Zipline

Algebra 2
Boot Camp Awesomeness

Norms

Vigilance

Accountability