GET to the CORE OF THE CORE

Purpose of the Core

Perseverance through the Change

Progression towards the Goal

MPJ

GET to the CORE OF THE CORE

Purpose

MPJ

GET to the CORE OF THE CORE

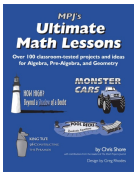
$6 + 4 + 4 + 8 = 21$

MPJ

GET to the CORE OF THE CORE

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



MPJ

GET to the CORE OF THE CORE

COMMON CORE
STATE STANDARDS INITIATIVE

Teach students to THINK and COMMUNICATE their thinking.

These are the 21st Century Skills.

MPJ

GET to the CORE OF THE CORE




MPJ

GET to the CORE OF THE CORE

Think & Communicate

are the 21st Century Skills.

Obtain & Retain

were the 20th Century Skills.

MPJ

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 ma...
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.

MPJ

GET to the CORE OF THE CORE

Think & Communicate

The 6 Shifts = The 21st Century Skills

MPJ

The 4 C's

EdLeader21

We are redefining LEARNING and SCHOOL.

Critical Thinking

Communication

Collaboration

Creativity

60%

MPJ

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

MPJ

GET to the CORE OF THE CORE

Think & Communicate

The 4 C's = The 21st Century Skills

MPJ

The 4 Claims

Smarter Balanced Assessment Consortium

We are redefining ASSESSMENT.

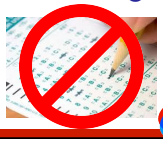
Concepts & Procedures

30%

Critical Thinking

Communicate Reasoning

Construct Models



MPJ

Old School vs New School

1 What is 6050.287 rounded to the nearest ten?

A 6050

B 6100

C 6050.29

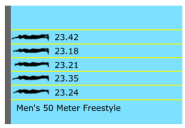
D 6050.3

MPJ

Old School vs New School

43025

Five swimmers compete in the 50-meter race. The finish time for each swimmer is shown in the video.



Explain how the results of the race would change if the race used a clock that rounded to the nearest tenth.

MPJ

Old School vs New School

33 $2\frac{1}{3}+4\frac{1}{2}=$

A $6\frac{1}{6}$

B $6\frac{1}{5}$

C $6\frac{2}{5}$

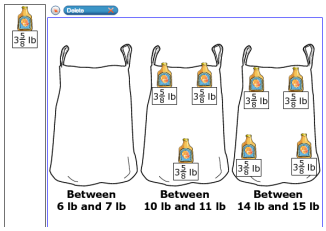
D $6\frac{5}{6}$

Old School vs New School

43328

Jared is testing how much weight a bag can hold. He plans to put juice bottles into three bags. He wants each bag to have a total weight within the given range.

- Drag juice bottles into each bag so that the weight is within the given range.
- Leave the bag empty if the given range is not possible using juice bottles.



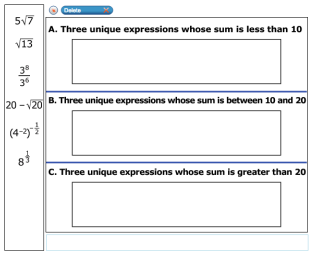
SBAC Claim: Concepts & Procedures

42906

A. Drag into the box exactly three unique expressions whose sum is less than 10.

B. Drag into the box exactly three unique expressions whose sum is between 10 and 20.

C. Drag into the box exactly three unique expressions whose sum is greater than 20.



SBAC Claim: Critical Thinking

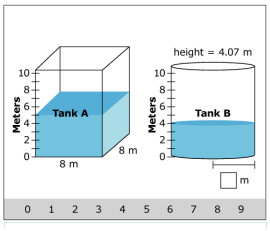
42968

Two water tanks are shown. Tank A is a rectangular prism and Tank B is a cylinder. The tanks are not drawn to scale.

Tank A is filled with water to the 10-meter mark.

Click Tank A to change the water level. The volume of water that leaves Tank A is transferred to Tank B, and the height of the water in Tank B is shown.

Drag one number into the box to show the approximate radius of the base of Tank B.



SBAC Claim: Communicate Reasoning

43052

Tony is buying a used car. He will choose between two cars. The table below shows information about each car.

Car	Cost	Miles Per Gallon (MPG)	Estimated Immediate Repairs
Car A	$3200	18	$700
Car B	$4700	24	$300

Tony wants to compare the total costs of buying and using these cars.

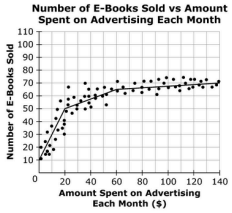
- Tony estimates he will drive at least 200 miles per month.
- The average cost of gasoline per gallon in his area is $3.70.
- Tony plans on owning the car for 4 years.

Calculate and explain which car will cost Tony the least to buy and use.

SBAC Claim: Models & Data

43028

Tyler earns $3.00 for every e-book he sells on his website. (E-books are books that are available electronically.) He investigated the relationship between the amount spent on advertising each month and the number of e-books sold. He used this information to determine the lines of best fit shown in this graph.



What is the greatest amount Tyler should spend on advertising each month? Show your work or explain how you found your answer.

GET to the CORE OF THE CORE

Think & Communicate

The 4 Claims = The 21st Century Skills

MPJ

The 8 Practices

COMMON CORE STATE STANDARDS INITIATIVE

The Practices are for the students.

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.

MPJ

The 8 Practices

COMMON CORE STATE STANDARDS INITIATIVE

Standards of Content
vs
Standards of Practice

Fluency

Deep Understanding

Multiplication as Grouping

Multi-Step Word Problems

Explain Reasoning

Algebra 1 Grades 6-9

Statistics

Transformations

Exponential Relations

Functions

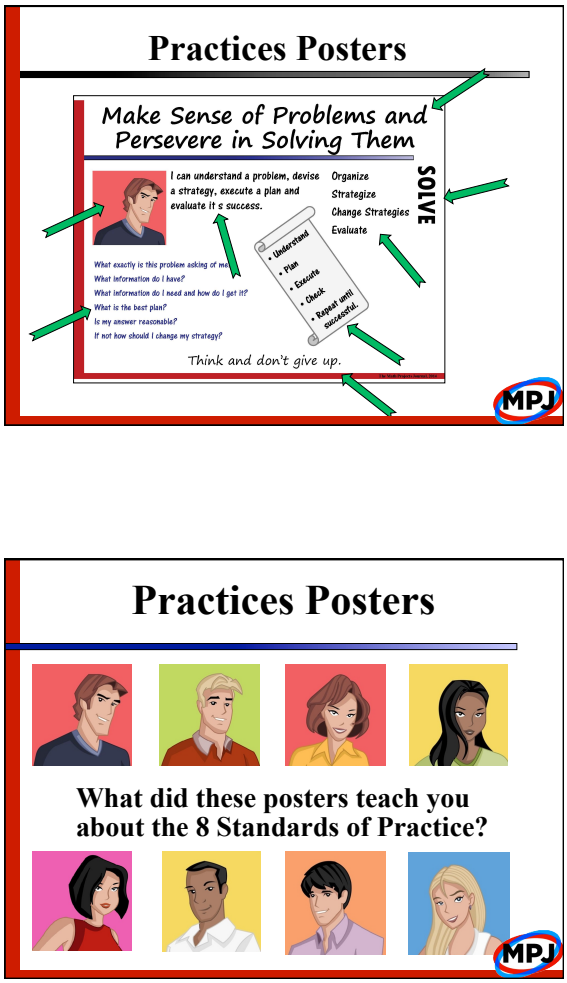
ELEMENTARY

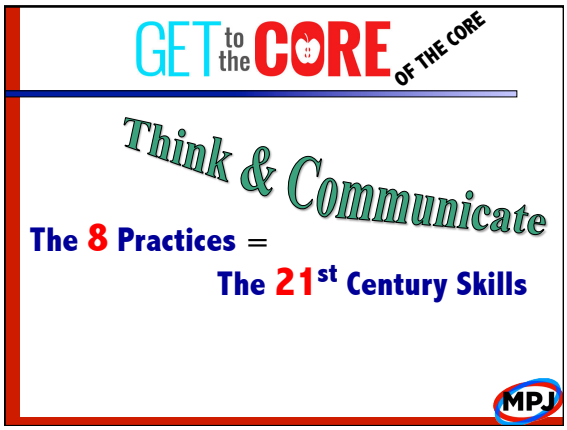
Secondary

MPJ

Practices Posters

Practices Posters





GET to the CORE OF THE CORE

The 6 Shifts
+ The 4 C's
+ The 4 Claims
+ The 8 Practices

= The 21st Century Skills

MPJ

GET to the CORE OF THE CORE

6 + 4 + 4 + 8 = 21

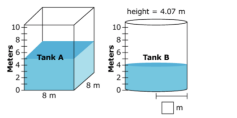
MPJ

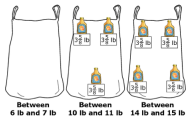
GET to the CORE OF THE CORE

Perseverance

MPJ

What Does This Say About Your New Job Description?





Car	Cost	Miles Per Gallon (MPG)	Estimated Immediate Repairs
Car A	$3200	18	$700
Car B	$4700	24	$300

$5\sqrt{7}$

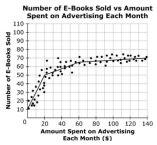
$\sqrt{13}$

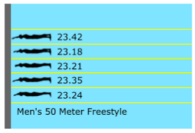
$\frac{3^8}{3^6}$

$20 - \sqrt{20}$

$(4^{-2})^{-\frac{1}{2}}$

$8^{\frac{1}{3}}$





MPJ

The New Classroom

by Achieve the Core

"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."

The Common Core is only a new expectation;
It does not dictate a change in instruction…
It only demands it.

MPJ

GET to the CORE OF THE CORE

Progression

MPJ

Explicit Teaching of Thinking

H.O.T.S.

Dr. John Star

"Math does not teach Problem Solving."

"Only the explicit teaching of thinking teaches thinking."

MPJ

Defining Problem Solving

Exercise

Problem

Don't Know How

Don't Have the Ability

Crisis

MPJ

Re-Orientation: This is THE Progression!

Notes-Oriented → Task-Oriented

30% *Dual Targets* 70%

Content and *Practice*

Daily!

MPJ

Task-Oriented Progression

What is a Task?

70%

30%

Notes & Drill

"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

Task-Oriented Progression

What is a Task?

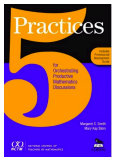
"a problem that provides an opportunity to develop mathematical ideas and [thinking]."

-- Adding it up (2001)

Tasks = Problems used to teach Content & Practices

MPJ

Task-Oriented Progression



Dr. Peg Smith

"It's all about the task.
It's all about the task.
It's all about the task."

MPJ

Tasks Are For Whom?

"Accelerated" Remedial Math Students with Rich & Robust Tasks

ALL Kids!

Dr. Uri Treisman

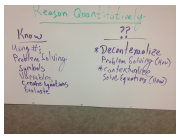
Dave Foster

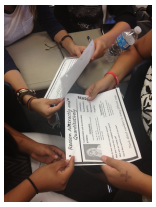
50% False Positives
Among 8th Grade Geometry
From CST to SBAC

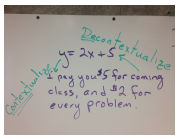
MPJ

Explicit Instruction through Tasks in Algebra

Target: We will use order of operations and quantitative reasoning to write expressions for a given value.

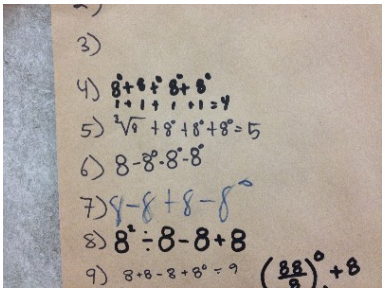






MPJ

Explicit Instruction through Tasks in Algebra

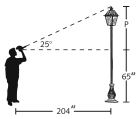


MPJ

Explicit Instruction through Tasks in Geometry

"not quit"

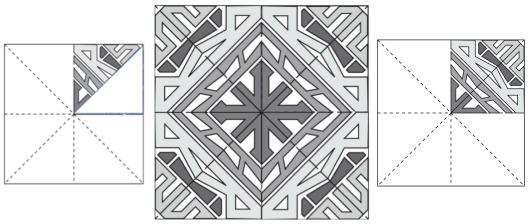
Target: We will persevere in solving problems with trigonometry.



Use Ratios	*Common Sense*
Substitute	*Fight the Gravity Storm*
Plot Points	*Use Tools*
Use Formulas	*Reverse the Steps*
Test Assumptions	*Draw*
Write an Equations	*Use Properties*
Guess-n-Check	*Teamwork*
Measure	*Wrestle the Bear*

MPJ

Creativity through a Task

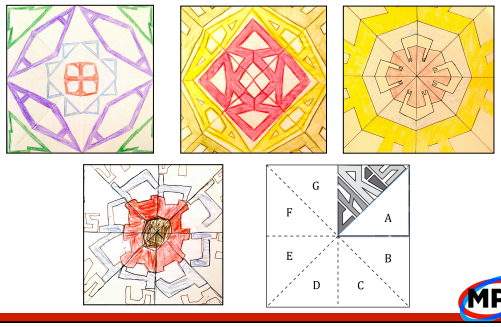


MPJ

Tools through a Task

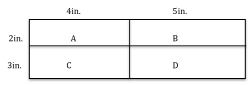
MPJ

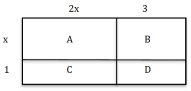
Structure through a Task



Explicit Instruction through Tasks in Algebra

Conceptual ➔ Procedural ➔ Application Practice

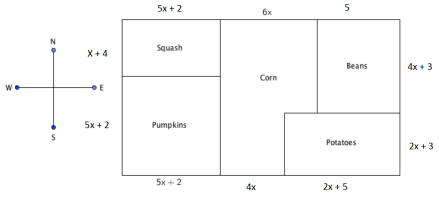




	Perimeter	Area
A		
B		
C		
D		
Large Rectangle		

Explicit Instruction through Tasks in Algebra

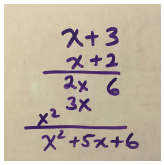
Conceptual ➔ Procedural ➔ Application Practice



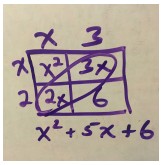
Explicit Instruction through Tasks in Algebra

Conceptual ➔ Procedural ➔ Application Practice

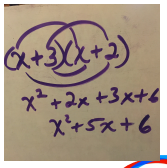
Stacking Method



Area Model
Box Method



FOIL method

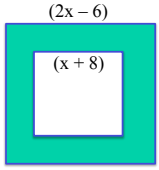


MPJ

Explicit Instruction through Tasks in Algebra

Audra is framing a square painting with side lengths of (x + 8) inches. The total area of the painting and the frame has a side length of (2x - 6). The material for the frame is $0.10 per square inch.

(2x – 6)

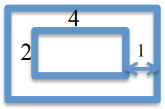


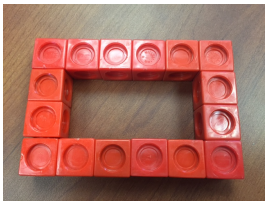
$(2x - 6)^2 - (x + 8)^2$

1. Write the expression for the area of the painting.
2. Write the expression for the area of the painting and the frame.
3. Write the expression for the area of the frame.
4. Find the area of the frame if x=16.
5. Find the cost of the material for the frame.

MPJ

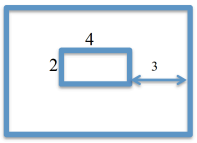
Explicit Instruction through Tasks in Algebra

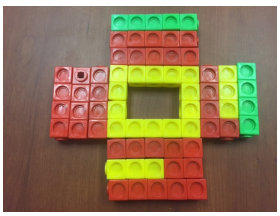




MPJ

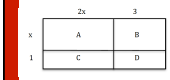
Explicit Instruction through Tasks in Algebra

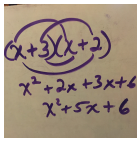


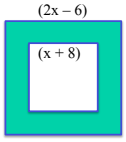


Explicit Instruction through Tasks in Algebra

Conceptual ➔ Procedural ➔ Application Practice







Lowest Grade on District Benchmark for Polynomials = **76%**

Classroom Models

Algebra 180 Blog

Geometry 180 Blog

www.mathprojects.com

Coupling the Claims & Practices

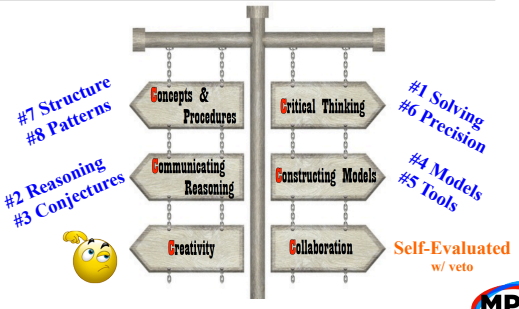
SBAC Claims
1. Concepts & Procedures
2. Critical Thinking
3. Communicate Reasoning
4. Construct Models & Data Analysis

Math Practices
1. Solve
2. Reason
3. Conjecture
4. Model
5. Tools
6. Precision
7. Structure
8. Patterns

MPJ

The 6 C's: Value–Based Grading

(my one original thought)



MPJ

The Take-Aways

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

Perseverance
so our *job description* has changed …

Progression
to the *explicit teaching* of the Standards of Content & the Standards of Practice by being *task-oriented.*

MPJ

Call to Action

Fail Grandly

No-Real Risk

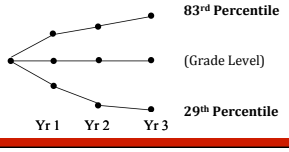
2-Week Rule

MPJ

Teacher Action is the Difference

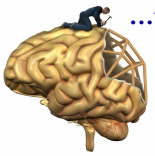
"The greatest influence in the quality of the education that a student receives is the decisions that a teacher makes on a daily basis."

-- Dr. William Schmidt, University of Michigan



MPJ

Teach students to *think & communicate* …



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

because what we do matters… the most.

www.mathprojects.com

MPJ