Objectives:

Math Technology Applications

- **Khan Academy**
- **Math animations**
- **Best practices**
- **Desmos Graphing Calculator**

Apple Applications:

- **Attendance application**
- **Socrative**

Common Core

- **Eight Mathematical Practice Standards**
- **Content Standards K-12**
- **Common Core Standards classroom resources**

Assessment

- **Smarter Balance**
- **PARCC**

KHAN ACADEMY

Show Coaches-how to add student for follow up

https://www.youtube.com/watch?v=Bd5X7Kz_Bpg

Coaches video is above.

SETTING OBJECTIVES and GOAL SETTING

Specific but flexible goals : The students set their own personal goals for each unit and teacher provides the general targets.

- I want to know, I want to know more…..
- Student Contracts

Technology is changing mathematics and its uses.

- A computer, a projector and Smart board/Starboard should be available in every classroom for demonstration purposes;
- Every student should have access to a computer for individual and group work;
- Students should learn to use the computer as a tool for processing information and performing calculations to investigate and solve problems;
- Appropriate calculators should be available to all students at all times.

We recognize, however, that access to this technology does not guarantee that any student become mathematically literate. The technology in the classroom is needed to simplify, but not to accomplish, the work at hand.

In our classes, mathematics instruction should include opportunities for

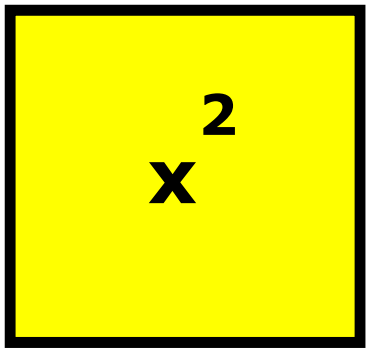
- Appropriate project work;
- Group and individual assignments;
- Discussion between teacher and students and among students;
- Exposition by the teacher;
- Immediate feedback;
- Practice on mathematical methods.

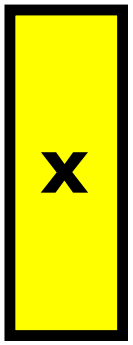
- Math Animations- The Story of number pi

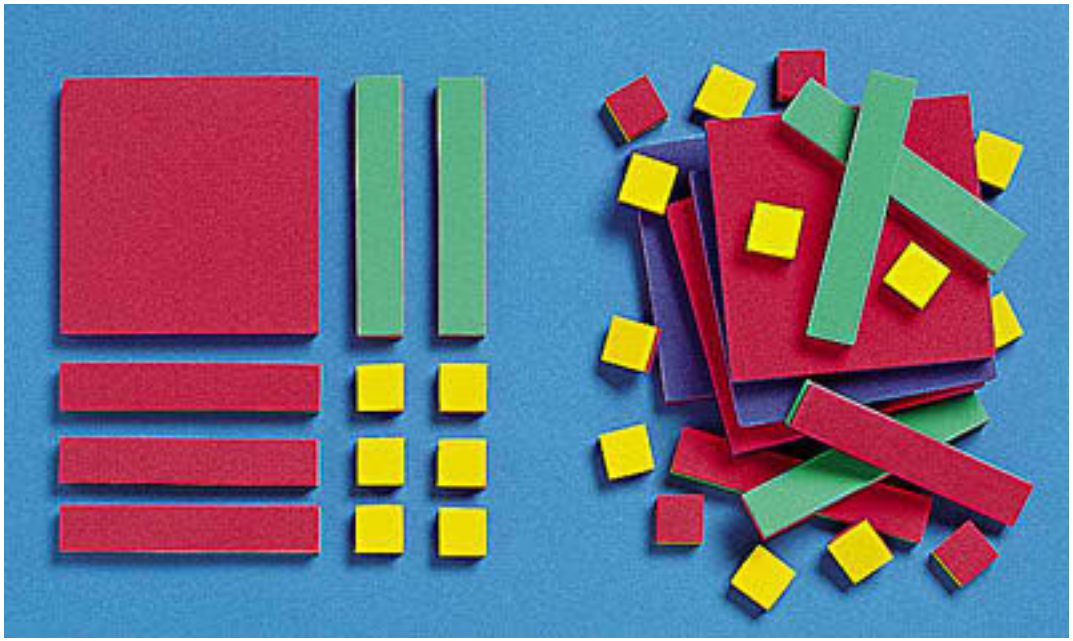
π

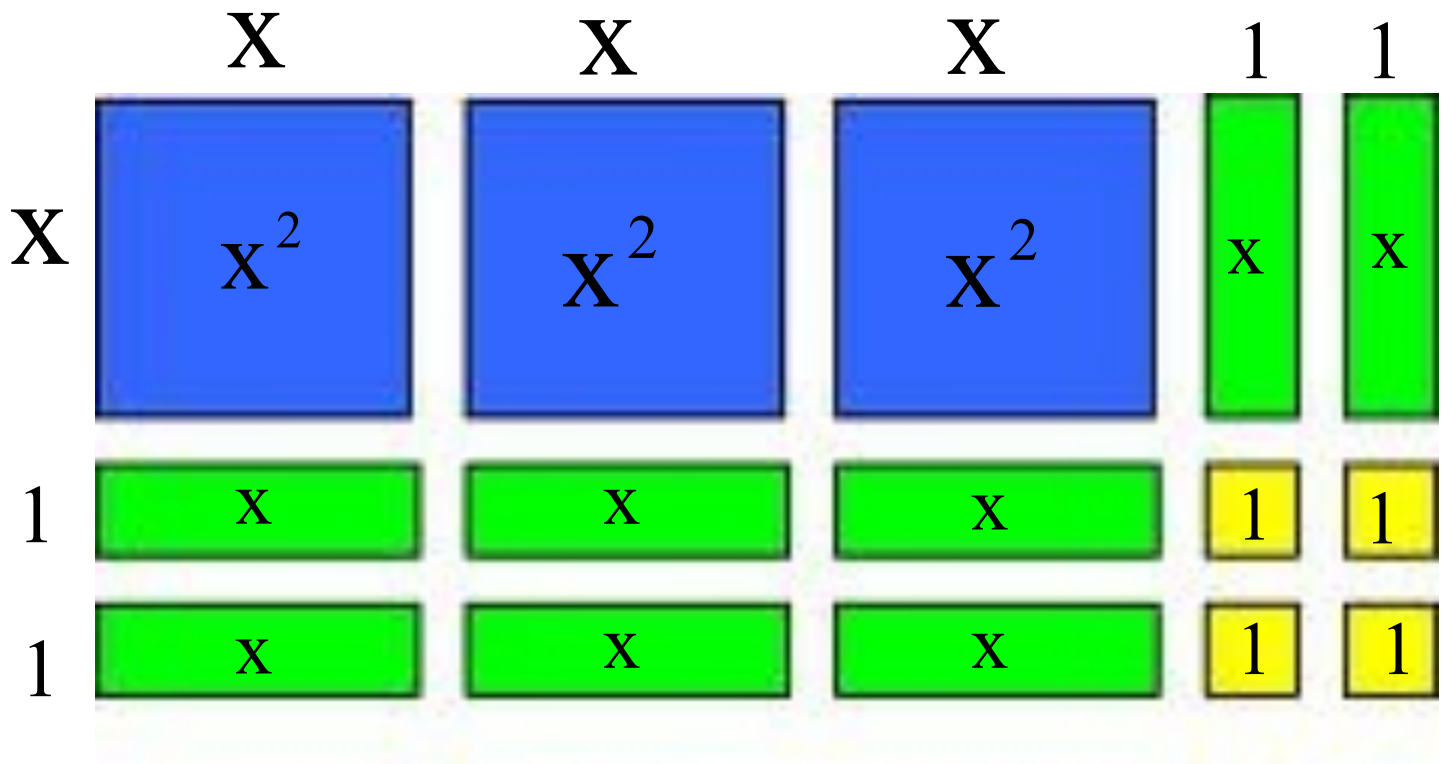
Desmos Graphing Calculator

ALGEBRA TILES







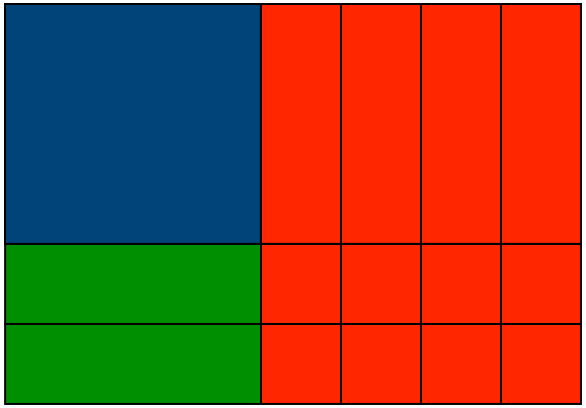


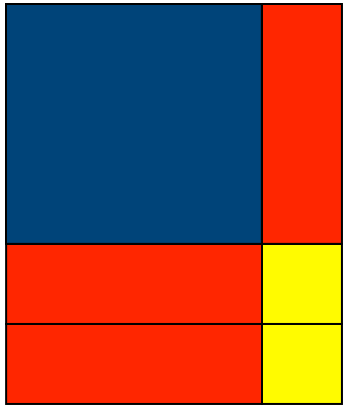
$$3x^2+8x+4=(3x+2)(x+2)$$

Multiplying & Factorising
General Aim

•Whether multiplying or factorising, the general aim is to generate a rectangle and have no pieces left over.

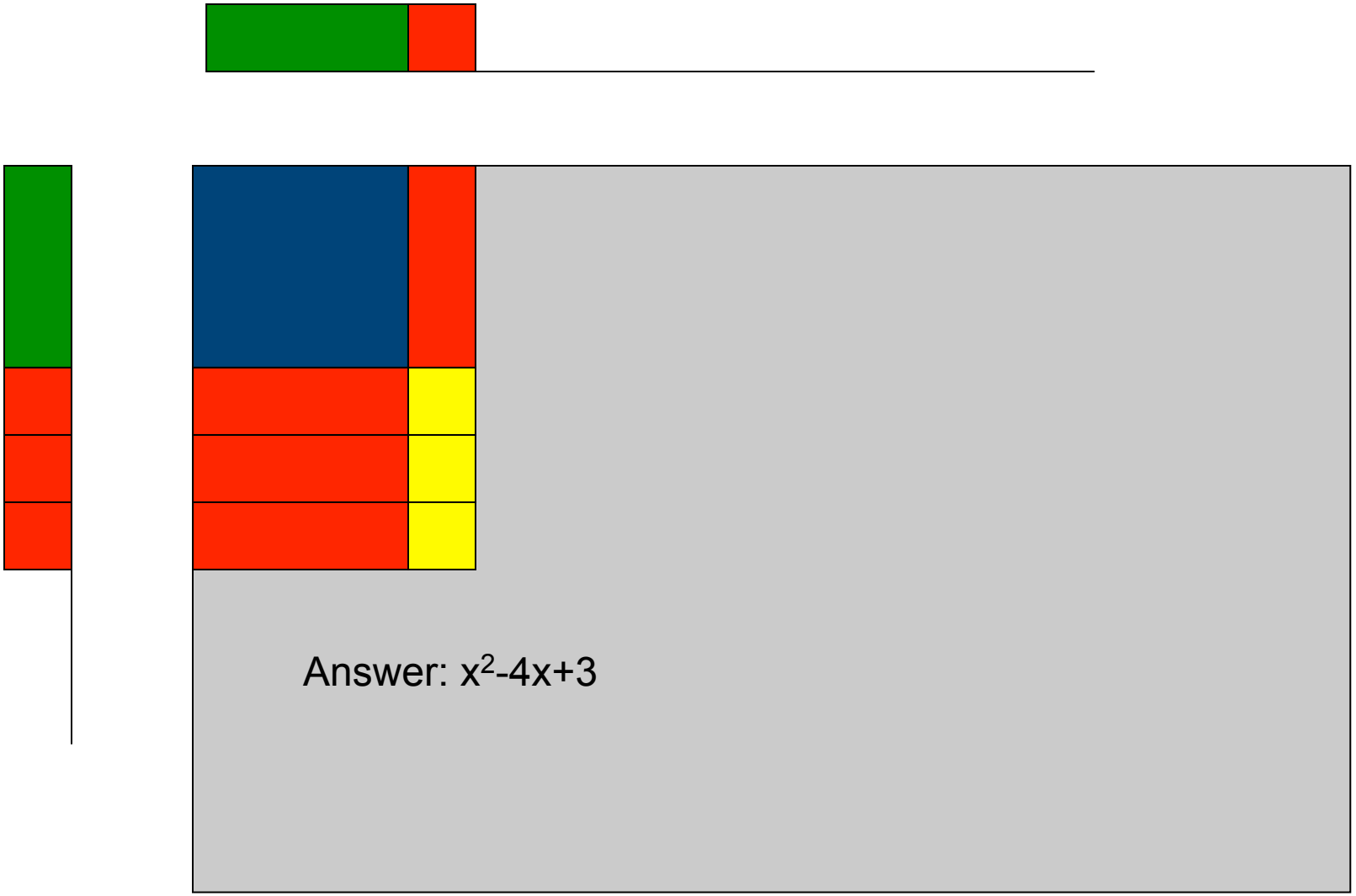
•Also the small squares always go in the bottom right hand corner



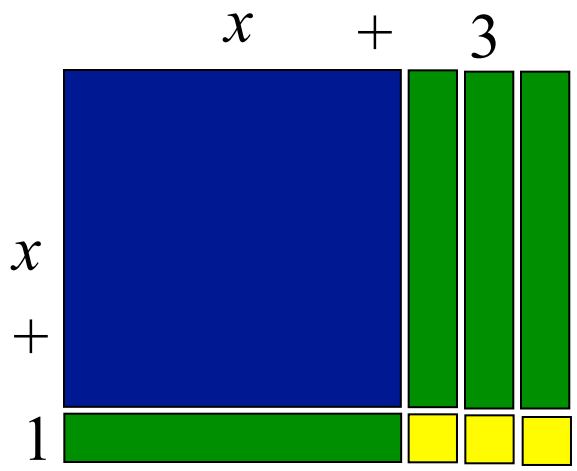


Section 4. Multiplying in algebra

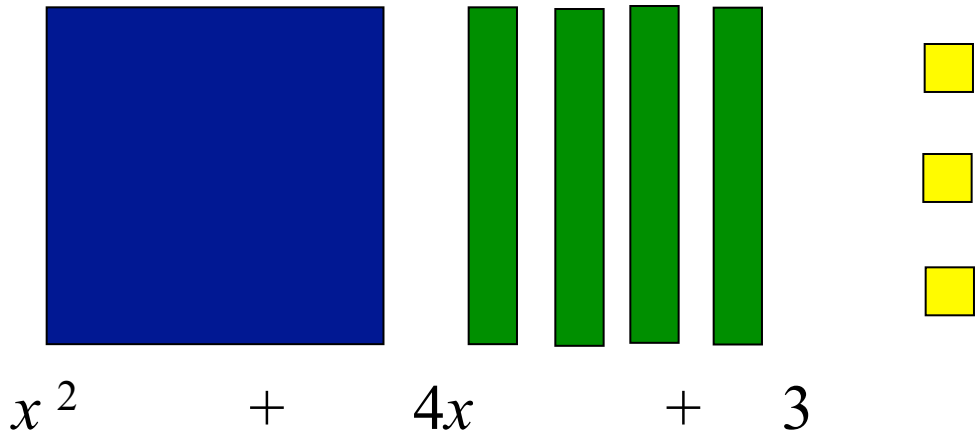
Example 2. Multiply (x-1)(x-3)



Show **(*x*+1)(*x*+3)** by arranging the tiles in a rectangle.

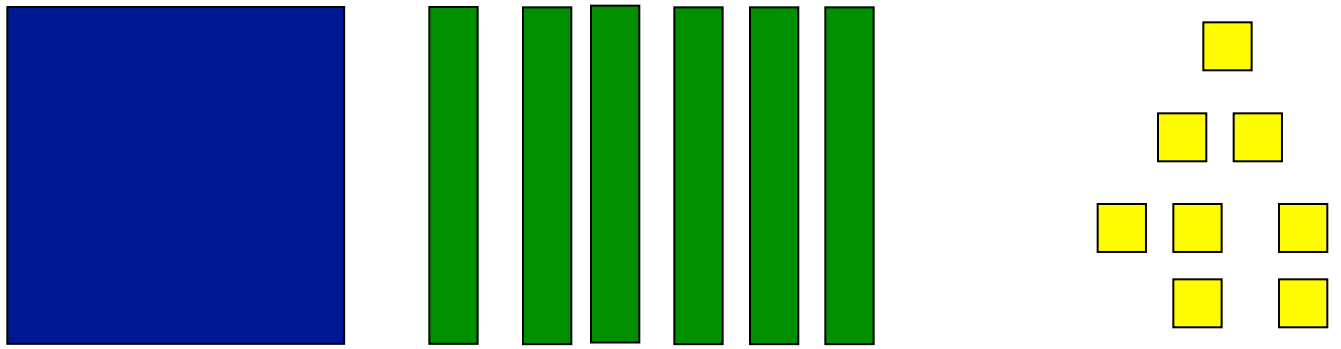


<u>Rearrange</u> the tiles to show the expansion:



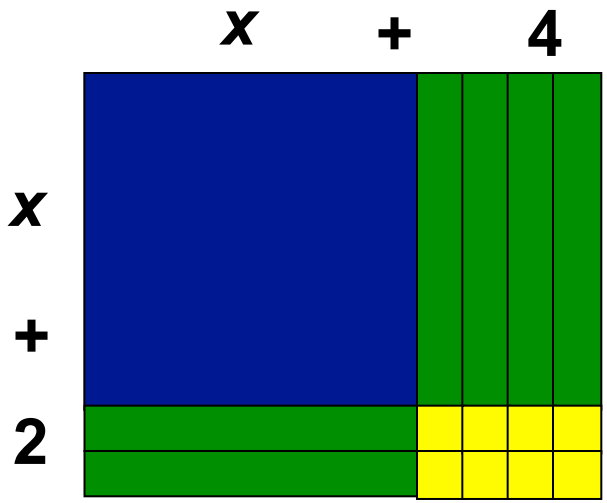
How it works

Factorise $x^2 + 6x + 8$



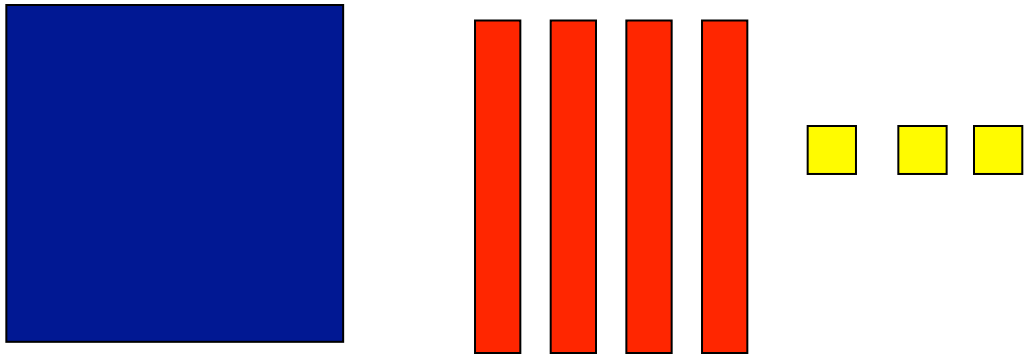
$x^2 \quad + \quad 6x \quad + \quad 8$

To factorise this expression form a rectangle with the pieces.



The factors are $(x + 4)(x + 2)$

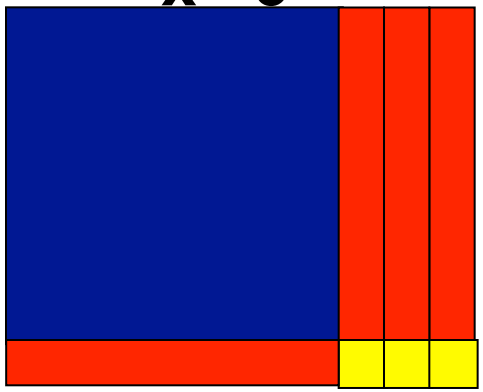
Factorise $x^2 - 4x + 3$



x^2 $\quad$ $-4x$ $\quad$ $+3$

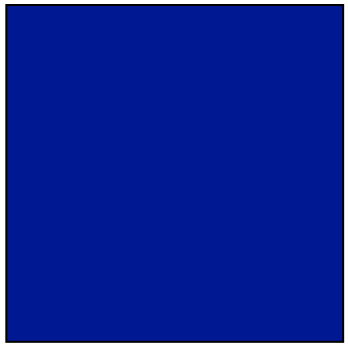
$x - 3$

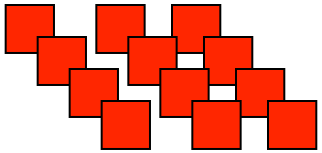
$x - 1$



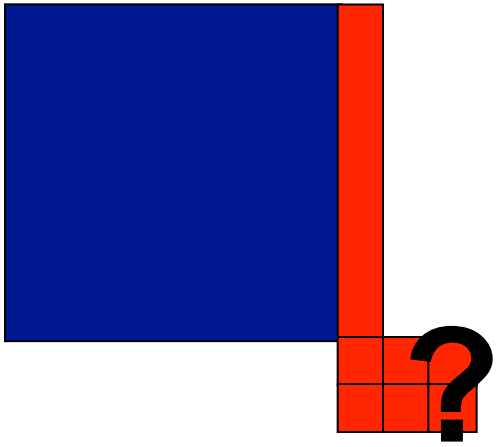
The factors are $\quad (x - 3)(x - 1)$

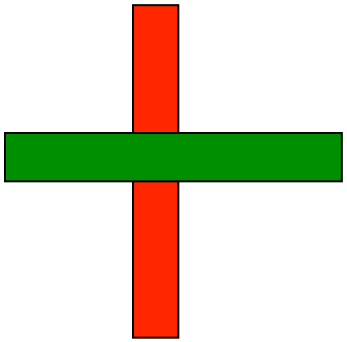
Factorise $x^2 - x - 12$





x^2 $\quad$ $-x$ $\quad$ -12



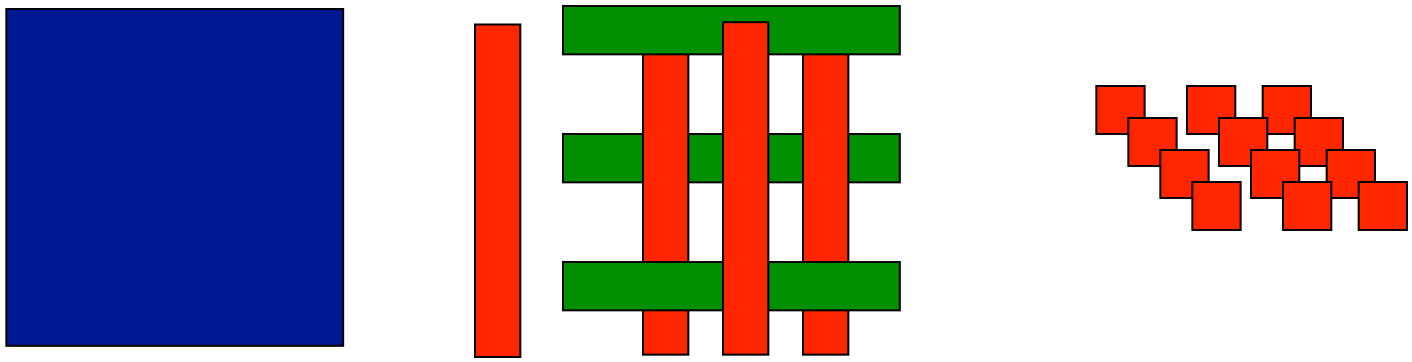


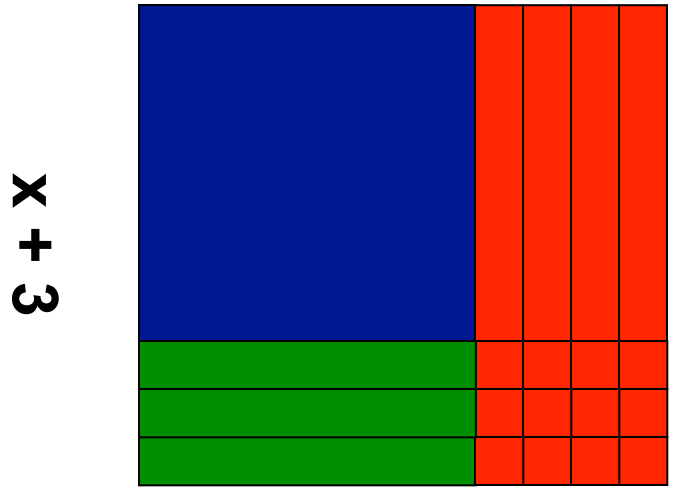
Clearly there is no way to accommodate the 12 small guys in the bottom right hand corner. What do you do?

You add in Zero in the form of +x and -x.

And keep doing it to complete the rectangle.

Factorise $x^2 - x - 12$





The factors are ? (x + 3)(x - 4)

Great Apple Application for the instructor to keep track of the students: Dave256 App

- Attendance is a universal iPhone/Touch/iPad application. It allows you to take and keep attendance records. Its main intended use is for teachers to keep track of records for their classes, but it can also be used for meetings and group gatherings.
- Attendance runs on iOS 4.0 and higher on the iPad, iPod Touch, and iPhone.

What are the futures that you can use in this App:

- Unlimited number of courses and students per course
  - sort students by last name or first name
  - manually re-order students to match a seating order
- Customizable attendance statuses
  - defaults statuses: Absent,Present,Late,Excused
  - can delete the defaults and add your own set of statuses
  - each course/group can have its own set of statuses
- Photo support automatically imports photo when importing from Address Book
  - take photo on iPhone
  - select photo from Photo Library (on iPhone/iPod Touch/iPad)
  - optionally view photos next to name while taking attendance
- Copy students from one course to a new course
  - start a new course for a new term
  - create a new course with same students
- Notes for
  - each course
  - each attendance date for a course
  - each student in a course
  - each student per date

What are the futures that you can use in this App:

- Optional TextExpander Touch integration for notes and composing emails
  - requires separate purchase of TextExpander for iOS (available in the iOS App Store) from Smile to get snippet expansion
- Email reports and compose emails to students
  - full spreadsheet report
  - records for a day
  - send email to all students in a course
  - send email to students who are absent on a given day
  - email individual attendance reports to each student
- Backup your data
  - backup/restore from your Dropbox account
  - setting to email internal Attendance database (sqlite database file) to yourself
  - place database file on a web server to import it back into Attendance
- Choose random students
  - choose individual students for answering questions
  - create random groups of sizes 2-30 (and email group members to yourself)

WHAT IS COMMON CORE?

The **Common Core** is a set of high-quality academic standards in mathematics and English language arts/literacy (ELA). These learning goals outline what a student should know and be able to do at the end of each grade.

www.**core**standards.org/about-the-standards/

A Grecian Urn

Standards for a Grecian Urn

Standards are like shattering a subject into a bunch of little pieces. The efforts of domain are the intentional attempt not to have standards seem like they are equally sized granular pieces which makes it harder to describe coherence. Common core wants to see standards as a continuum, where there are different sized pieces with distinct architectural pieces.

Focus, coherence, and rigor work together

A Grecian Urn

- It's pretty clear what the focus is here; nobody is going to say this is all about grape leaves.
- But the grape leaves are important; details large and small make this a coherent work of art.
- Craftsmanship shows in the balance between between art, technique, and story.
- Rigor is the balance that produces students who can use what they know; who show craft in using mathematics.

Focus - attending to fewer topics in greater depth at any given grade level, giving teachers and students time to complete that grade's learning.

Coherence - attending to the structure of mathematics and the natural pathways through that structure, where "natural" means taking into account both the imperatives of logic and the imperatives of cognitive development in designing the sequence of ideas.

What is logical and what fits naturally in the students natural progress through a student's development?

Rigor - balancing conceptual understanding, procedural fluency, and meaningful applications of mathematics. Similar to a sport that is gets progressively more difficult.
http://www.youtube.com/watch?v=aAiCoc4BhJ8

PROGRESSION ACROSS GRADE LEVELS

The case of patterns

Moved pattern standards from kindergarten to be able to focus on numbers and operations.

Trickle of pattern standards in elementary school

- 3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations
- 4.OA.5 Generate a number or shape patterns that follows a given rule. Identify apparent features of the patterns that were not explicit in the rule itself.
- 5.OA.3. (Supports the idea of a function) - Generate two numerical patterns using two given rules. Identify apparent relationship between corresponding terms.

Common Core Standards by themselves are not going to solve all of problems, the solution is in the teachers taking ownership of the implementation of this content in order to teach students to solve problems.

Google

8.EE.6

8.ee.6
8.ee.6 **worksheets**
8.ee.6 **activities**
8.ee.6 **lesson plans**

About 371,000,000 results (0.43 seconds)

[PDF] **8.EE** TEACHER'S GUIDE - EngageNY
https://www.engageny.org/.../01-**8.ee**_teachers_guide_lesson_5-1v7.pdf?...
8.EE.6 DERIVING EQUATIONS FOR LINES. WITH NON-ZERO Y-INTERCEPTS. Development from y = mx to y = mx + b. DRAFT 2012.11.29. TEACHER'S ...

CCSS Math » **8.EE.6**
ccssmath.org/?page_id=1240
8.EE.6 – Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the ...

8.EE.B - Illustrative Mathematics
https://www.illustrativemathematics.org/**8.EE**.B
8.EE.B. Understand the connections between proportional relationships, lines, and ... 8.EE.B.6. Use similar triangles to explain why the slope m is the same ...

Derive y=mx+b using similar triangles - LearnZillion

https://learnzillion.com/.../1473-derive-ymxb-using-si...
Jun 19, 2014
... Describe positive and negative slopes · Derive y=mx using similar triangles · Derive y=mx+b using similar ...

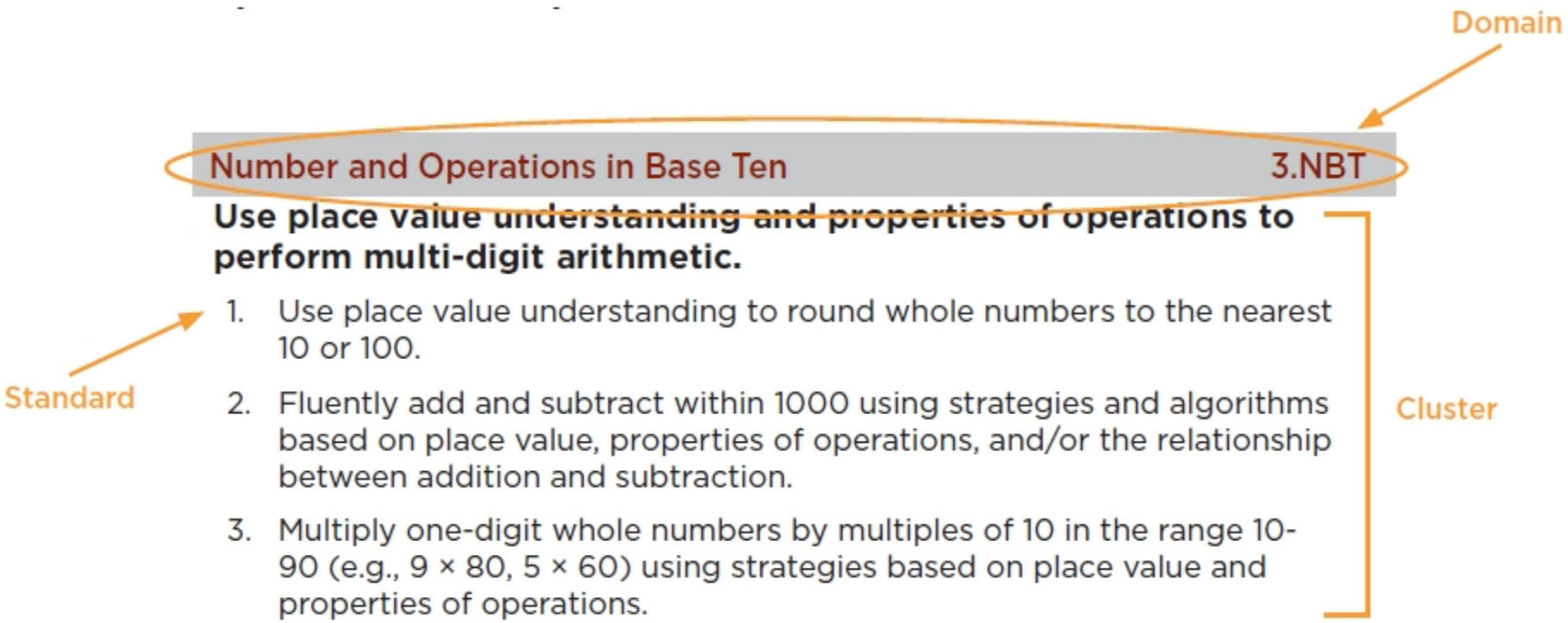
Use similar triangles to explain why the slope m is the same ...
https://learnzillion.com/.../274-use-similar-triangles-to-explain-why-the-s...
Jun 20, 2014 - Common Core: **8.EE.B.6** | by: Ethan Merlin. In this lesson you will learn to determine coordinates of points on a straight line by using similar ...

Make lines from right triangles - for teachers | LearnZillion

https://learnzillion.com/.../1341-make-lines-from-right...
Jun 19, 2014
... Describe positive and negative slopes · Derive y=mx using similar triangles · Derive y=mx+b using similar ...

What's new about the Common Core?
Gives you the power of **sharing.** States have been at the forefront of the sharing effort. (ie. Arizona displayed the standards with examples and exemplars, Engage New York (website), and Tennessee)

Arrangement of content standards



- *Content standards* define what students should understand and be able to do
- *Clusters* are groups of related standards
- *Domains* are larger groups that progress across grades

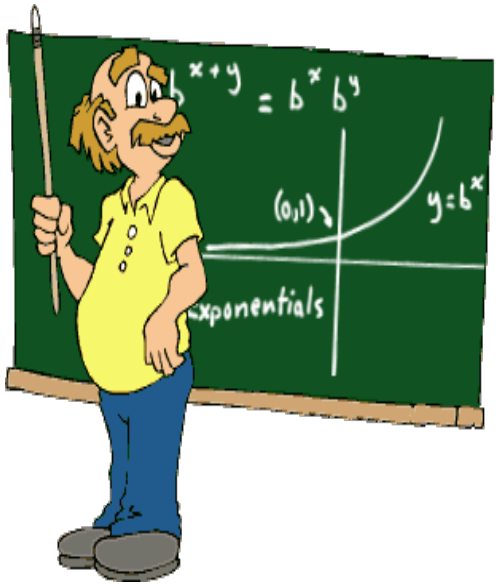
CONTENT STANDARDS: Domains

- ❑ Counting and Cardinality (CC),
- ❑ Operations and Algebraic Thinking (OA),
- ❑ Number and Operations in Base Ten (NBT),
- ❑ Number and Operations – Fractions (NF),
- ❑ Ratios and Proportional, Relationships (RP),
- ❑ The Number System (NS),
- ❑ Measurement and Data (MD),
- ❑ Expressions and Equations (EE),
- ❑ Functions (F),
- ❑ Geometry (G),
- ❑ Statistics and Probability (SP).

The standards do not emphasize simplification of fractions as much as equivalence. Teaching students that 6/10 is as good as 3/5 is key and students should not be marked wrong if they do not simplify.

Common core standards are much less focused on terminology and much more focus on the conceptual understanding.

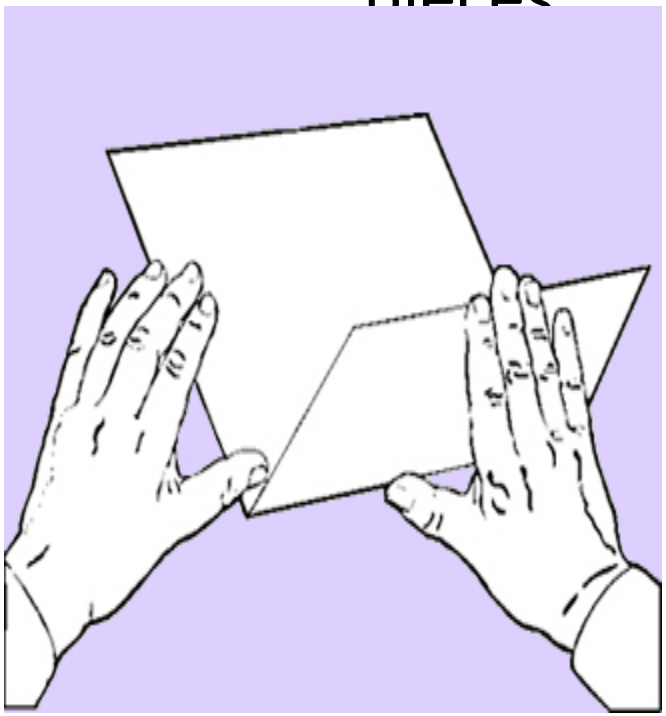
EXPONENTIAL NUMBERS AND PAPER FOLDING



Why is the zero power of any number equal to 1?

# of folding

2 = number of equal pieces



# of folding	# of equal pieces
0	$2^0 = 1$
1	$2^1 = 2$
2	$2^2 = 4$
3	$2^3 = 8$

Standards for Mathematical Practice in Action

Practice	Sample Student Evidence	Sample Teacher Actions	Questions (Self Talk)
1. Make sense of problems and persevere in solving them	◻ Display sense-making behaviors ◻ Show patience and listen to others ◻ Turn and talk for first steps and/or generate solution plan ◻ Analyze information in problems ◻ Use and recall multiple strategies ◻ Self-evaluate and redirect ◻ Assess reasonableness of process and answer	◻ Provide open-ended problems ◻ Ask probing questions ◻ Probe student responses ◻ Promote and value discourse ◻ Promote collaboration ◻ Model and accept multiple approaches	◻ What is the problem about? ◻ How can I get started? ◻ Have I ever worked a problem like this? ◻ What do I already know that is related? ◻ What do I do when I get stuck? ◻ Can I use friendlier number to help me make sense of this problem? ◻ Am I doing what makes sense? ◻ Does my answer make sense?
2. Reason abstractly and quantitatively	◻ Represent abstract and contextual situations symbolically ◻ Interpret problems logically in context ◻ Estimate for reasonableness ◻ Make connections including real life situations ◻ Create and use multiple representations ◻ Visualize problems ◻ Put symbolic problems into context	◻ Model context to symbol and symbol to context ◻ Create problems such as "what word problem will this equation solve?" ◻ Give real world situations ◻ Offer authentic performance tasks ◻ Place less emphasis on the answer ◻ Value invented strategies ◻ Think Aloud	◻ Does my strategy make sense in the situation? ◻ Can I work with the math differently outside the situation? ◻ Does my answer make sense in the situation? ◻ What do the symbols in this problem mean? ◻ What does it look like in the real world? ◻ What math can be seen in this situation?
3. Construct viable arguments and critique the reasoning of others	◻ Questions others ◻ Use examples and non-examples ◻ Support beliefs and challenges with mathematical evidence ◻ Forms logical arguments with conjectures and counterexamples ◻ Use multiple representations for evidence ◻ Listen and respond to others well ◻ Uses precise mathematical vocabulary	◻ Create a safe and collaborative environment ◻ Model respectful discourse behaviors ◻ "Find the error" problems ◻ Promote student to student discourse (do not mediate discussion) ◻ Plan effective questions or Socratic formats ◻ Provide time and value discourse	◻ Can I provide evidence to support my thinking? ◻ Do I understand another's explanation? ◻ Can I ask a good question to understand another's thinking better? ◻ Will this strategy always work? ◻ What did I learn form not getting the same answer as my classmates? ◻ Is another's explanation reasonable and mathematically true?

Standards for Mathematical Practice in Action

Practice	Sample Student Evidence	Sample Teacher Actions	Questions (Self Talk)
4. Model with mathematics	◻ Connect math (numbers and symbols) to real-life situations ◻ Symbolize real-world problems with math ◻ Make sense of mathematics ◻ Apply prior knowledge to solve problems ◻ Choose and apply representations, manipulatives and other models to solve problems ◻ Use strategies to make problems simpler ◻ Use estimation and logic to check reasonableness of an answer	◻ Model reasoning skills ◻ Provide meaningful, real world, authentic performance-based tasks ◻ Make appropriate tools available ◻ Model various modeling techniques ◻ Accept and value multiple approaches and representations	◻ Can I figure out what math would help me solve this real-world problem? ◻ Did my model work? Did my answer make sense? ◻ Is there another mathematical model that might work? ◻ Is there more than one way to represent this problem?
5. Use appropriate tools strategically	◻ Choose appropriate tool(s) for a given problem ◻ Use technology to deepen understanding ◻ Identify and locate resources ◻ Defend mathematically choice of tool	◻ Provide a "toolbox" at all times with all available tools – students then choose as needed ◻ Model tool use, especially technology for understanding	◻ What objects or materials would help me think about the problem? ◻ What representations would help me think about the problem? ◻ Should I use a calculator? ◻ What strategies do I know that would help me? ◻ What tools have I used with a similar problem? ◻ What tools are available? ◻ Will estimation or mental math help?
6. Attend to precision	◻ Communicate (oral and written) with precise vocabulary ◻ Carefully formulate questions and explanations (not retelling steps) ◻ Decode and interpret meaning of symbols ◻ Pay attention to units, labeling, scale, etc. ◻ Calculate accurately and effectively ◻ Express answers within context when appropriate	◻ Model problem solving strategies ◻ Give explicit and precise instruction ◻ Ask probing questions ◻ Use ELA strategies of decoding, comprehending, and text-to-self connections for interpretation of symbolic and contextual math problems ◻ Guided inquiry	◻ Have I used the right words to communicate my meaning? ◻ Is my answer accurate? ◻ Do I understand the meaning of the symbols I used? ◻ Is my work accurate and easy to follow? ◻ Have I used all the labels needed for someone to understand my work?

Standards for Mathematical Practice in Action

Practice	Sample Student Evidence	Sample Teacher Actions	Questions (Self Talk)
7. Look for and make use of structure	◻ Look for, identify, and interpret patterns and structures ◻ Make connections to skills and strategies previously learned to solve new problems and tasks ◻ Breakdown complex problems into simpler and more manageable chunks ◻ Use multiple representations for quantities ◻ View complicated quantities as both a single object or a composition of objects	◻ Let students explore and explain patterns ◻ Use open-ended questioning ◻ Prompt students to make connections and choose problems that foster connections ◻ Ask for multiple interpretations of quantities	◻ Can I figure out and use properties about how the operations work? ◻ Can I figure out and use properties about how these numbers work? ◻ Can I figure out and use properties about how the symbols work? ◻ Can I compose or decompose to help me see the structure? ◻ Can I add a representation to help me see the structure?
8. Look for and express regularity in repeated reasoning	◻ Design and state "shortcuts" ◻ Generate "rules" from repeated reasoning or practice (e.g. integer operations) ◻ Evaluate the reasonableness of intermediate steps ◻ Make generalizations	◻ Provide tasks that allow students to generalize ◻ Don't teach steps or rules, but allow students to explore and generalize in order to discover and formalize ◻ Ask deliberate questions ◻ Create strategic and purposeful check-in points	◻ If I am doing something repeatedly, can I come up with a general method or a shortcut? ◻ What is staying the same and what is changing? ◻ What comes next? Next? Is there a pattern? ◻ Is there a shorter or more efficient way to get to a result?

STANDARDS FOR MATHEMATICAL PRACTICE with KEY WORDS FOR 8 MATHEMATICAL PRACTICE STANDARDS (MP)

These 8 standards explain how CCSS need to be taught

1. Make sense of problems and persevere in solving them. MP 1: Explain, Strategize, Justify, Question/Reflect, Evaluate/Analyze

2. Reason abstractly and quantitatively. MP 2: Make sense, contextualize, interpret, access, decontextualize, represent, solve

3. Construct viable arguments and critique the reasoning of others. MP 3: Discuss, illustrate, demonstrate, explain, question

4. Model with mathematics. MP 4: Abstract, create, interpret, analyze/reflect, improve

5. Use appropriate tools strategically. MP 5: Consider, select, use, apply, recognize

6. Attend to precision. MP 6: Select, use, describe, and calculate

7. Look for and make use of structure. MP 7: Generalize, Identify/describe structures, repeated reasoning, apply structures

8. Look for and express regularity in repeated reasoning. MP 8: identify, formulate, articulate, describe, and communicate

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COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

MAKE SENSE of PROBLEMS

Picture the situation.

Have I solved a problem like this before?

Look for clue words.

What is given?

What is not given?

What tools will I use?
- -number sentence
- -chart, table
- -number line
- -manipulatives
- -draw a picture

Find a good place to start, and begin solving.

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COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

PERSEVERE in SOLVING them

Does my answer and/or my strategy make sense?

Try a new strategy if it isn't working.

What worked?

What didn't work?

Try a different strategy to check my work.

How does my solution compare to others?

What can I learn from this?

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COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

REASON ABSTRACTLY and QUANTITATIVELY

with numbers & symbols out of context	with numbers & amounts in context
53 + ☐ = 75	53 students get on the bus
Properties & Operations	4 students get off the bus
53 - 4 = ☐	75 seats on the bus
Base Ten Number System	25 miles per hour
	traveled 66 miles in 3 days

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10/3/2013

COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

CONSTRUCT a VIABLE ARGUMENT

make create present	clear understandable accurate possible	explanation solution method for getting the correct answer

SHOW HOW YOU GOT YOUR ANSWER,
AND
EXPLAIN WHY YOU USED THOSE NUMBERS
AND/OR OPERATIONS...
...IN A WAY THAT MAKES SENSE TO OTHERS.

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5 / 10 64.3% Find

COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

CRITIQUE the REASONING of others

I agree with _____ because _____

I do not understand _____
How did you get that?

Where is this part of the problem?

I disagree with _____ because _____

Why is that true?

What's the definition of _____ ?

2:51 PM
10/3/2013

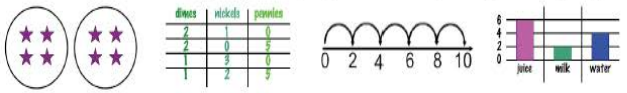
COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

MODEL with MATHEMATICS

Write number sentences and equations for a given problem.

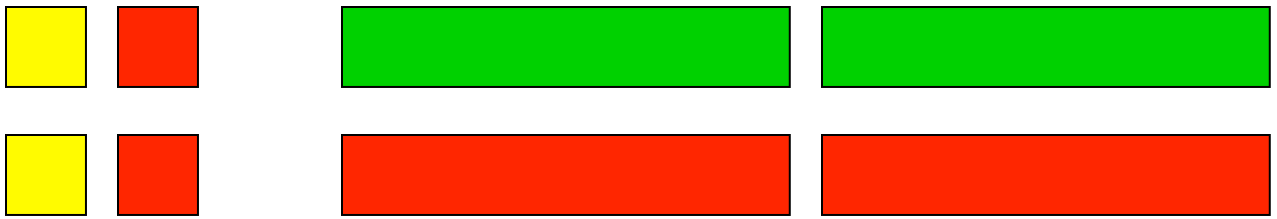
Create representations, tables, number lines, and graphs.



Write problems for a given number sentence or equation.

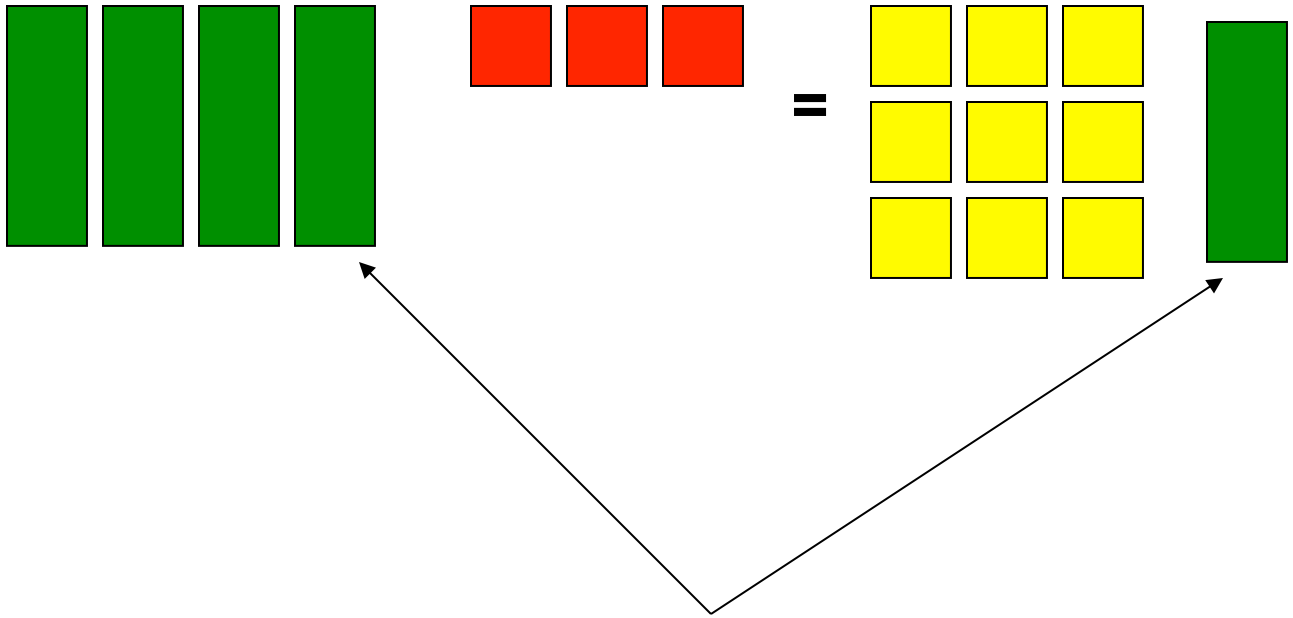
Zero Pairs

- When put together, zero pairs cancel each other out to model zero.



Section 6. Doing linear equations

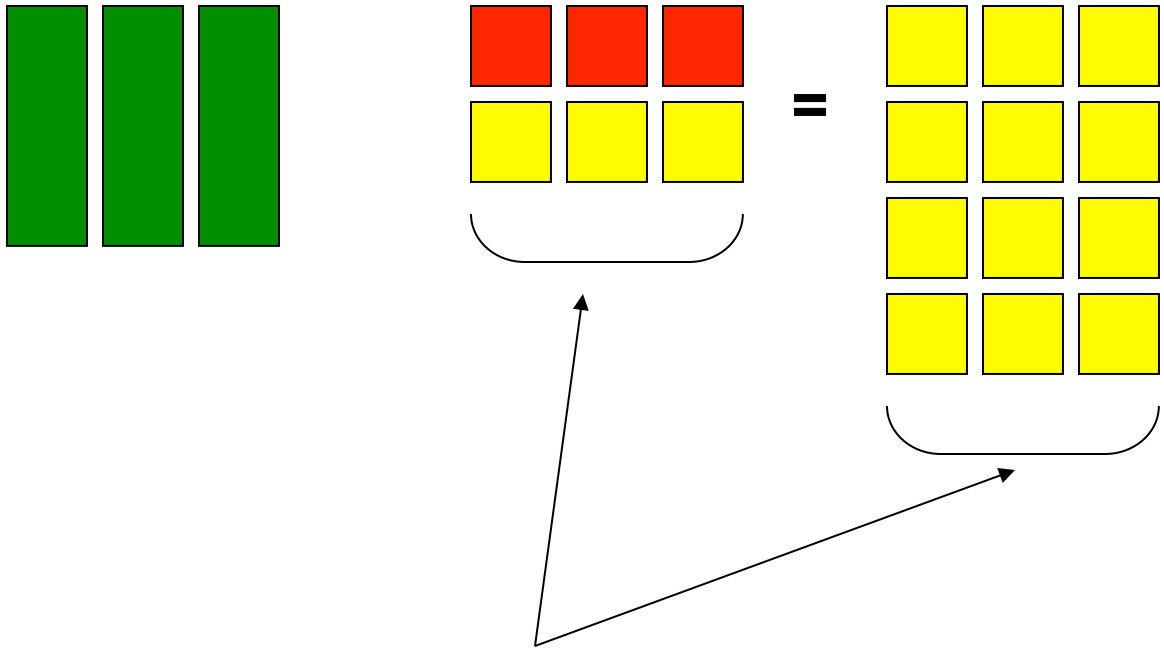
Solve $4x - 3 = 9 + x$



You can take away the same thing from both sides

Section 6. Doing linear equations

Solve $4x - 3 = 9 + x$



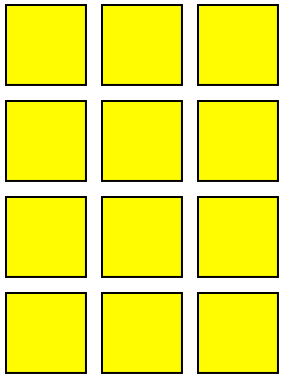
You can add the same quantity to both sides

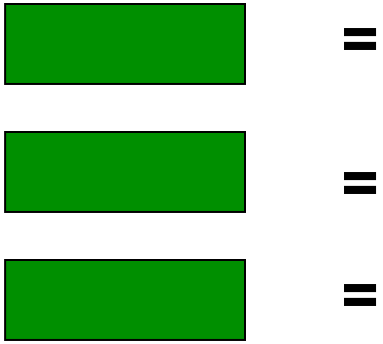
Section 6. Doing linear equations

Solve $4x - 3 = 9 + x$

Section 6. Doing linear equations

Solve $4x - 3 = 9 + x$





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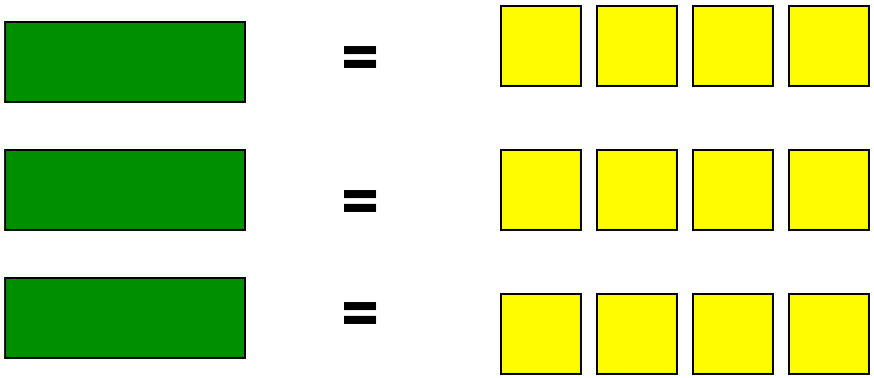


Solution x = 4

COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

USE APPROPRIATE TOOLS STRATEGICALLY

Base Ten blocks

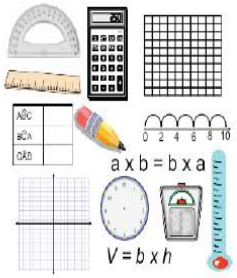
Unifix cubes

Estimation

Measuring tools

Number lines

Graph paper



Paper & pencil

Knowledge of numbers & properties

Drawings

Tables

Charts

Organized lists

Calculator

Online search

COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

ATTEND to PRECISION

be precise, accurate in...

Problem Solving & **Communicating**

Calculate ACCURATE answers.

Find an EFFICIENT method for calculating my answer.

Check my work:
Does my answer MAKE SENSE?

Speak, Read, Write, and Listen MATHEMATICALLY.

Correctly USE:
- Math SYMBOLS
- Math VOCABULARY
- UNITS of MEASURE

COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

Building Mathematical Character

LOOK FOR and MAKE USE of STRUCTURE

understanding parts, wholes, and patterns in...

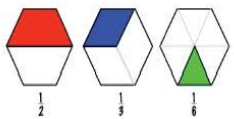
Numbers & Shapes

Using Base 10 structure
Using Operations and Properties
56 + 23 =
56 + (2 tens + 3) → 56, 66, 76 + 3 = 79

The Distributive Property:
8 x 7 =
8 x (5 + 2) =
(8 x 5) + (8 x 2) =
40 + 16 = 56

Sorting Shapes by Attributes
-number of sides
-number of right angles

Using dimensions to calculate area, volume



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COMMON CORE STATE STANDARDS · MATHEMATICAL PRACTICES

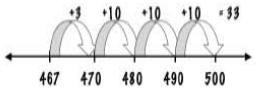
Building Mathematical Character

LOOK FOR and EXPRESS REGULARITY in REPEATED REASONING

Noticing repeated calculations and strategies and finding general methods and short cuts

Using Doubles facts
5 + 8 =
5 + 5 + 3 =
10 + 3 = 13

500 - 467 is the same as 467 + ☐ = 500



3+3+3+3+3 → five 3s added together = 5 x 3
5 x 3 has the same product as 3 x 5 (Commutative Property)
3 x 5 → 5, 10, 15 = 15

Repeated subtraction is related to division.
Division can be thought of as a missing factor.

You have:	Each costs:	How many can you buy?
$36	$9	$36-$9-$9-$9-$9

OR

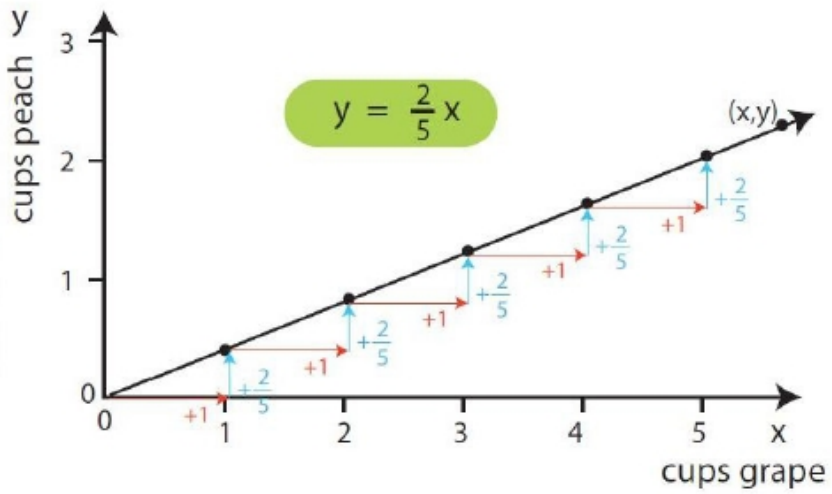
☐ x $9 = $36

2:55 PM
10/3/2013

Look for and express regularity in repeated reasoning

For every 5 cups grape juice, mix in 2 cups peach juice.

x cups grape	y cups peach
(0)	(0)
5	2
1	$\frac{2}{5}$
2	$2 \cdot \frac{2}{5}$
3	$3 \cdot \frac{2}{5}$
4	$4 \cdot \frac{2}{5}$
x	$x \cdot \frac{2}{5}$



MATHEMATICAL PRACTICES VIDEOS

Priorities for Focus

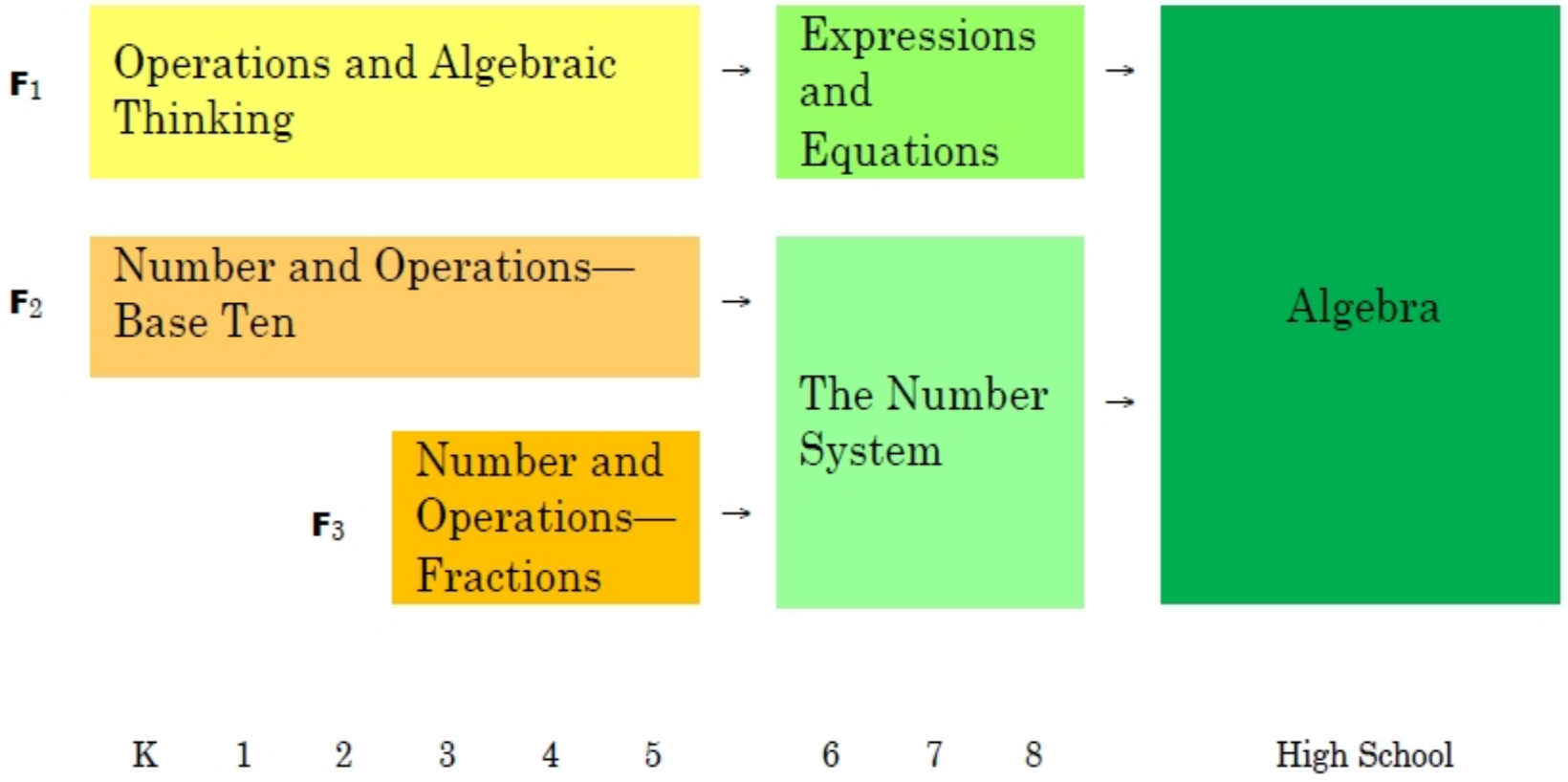
	10% Sample	20% Rethink and Link	70% Intensive Focus
K-2 examples	• Patterns • Statistics/Data • Probability • Estimating computations	• Geometry and measurement	• Addition and subtraction concepts, skills, and problem solving
3-5 examples	• Patterns • Statistics/Data • Probability	• Area, volume	• Multiplication and division of whole numbers and fractions, balance of concepts, skills, problem solving
6-8 examples	• Statistics	• Quantitative relationships and functions	• Proportional reasoning and linearity • Algebra • Geometric measurement

Common Core State Standards – Mathematics

Standards Progressions

Kindergarten	1	2	3	4	5	6	7	8	HS
Counting and Cardinality									Number and Quantity
Number and Operations in Base Ten						Ratios and Proportional Relationships			
			Number and Operations - Fractions			The Number System			
Operations and Algebraic Thinking						Expressions and Equations			Algebra
								Functions	Functions
Geometry						Geometry			Geometry
Measurement and Data						Statistics and Probability			Statistics and Probability

Flows leading to algebra



What mistakes can be made with implementation of common core?

- Obsession with coverage in the lesson plans.

- Trying to do too much at once, choice the big targets first.

BACKWARD DESIGN

- We need to teach to the testing- PARCC and Smarter Balanced and/or EOC.

- **Backward Design:** Thinking about assessment before deciding how you teach, planning instruction, what resources you will use and finally and most importantly..

  How will the student prove he/she has learned the target.

- As much as it is wonderful to have the textbook and its online resources by our side, and they make our life easier, we are not teaching to the textbook. Teachers are teaching to PARCC and Smarter Balanced tests in K-12.

- We should focus on the standards, how to unpack them, how to bring up more and more common core questions and how to implement MP.

- How familiar are we, with the standards? With evidence statements?

DAN MEIER

We need patient problem-solvers in our math classes!

-Dan Meier

The question we used to ask ourselves,
"How can I teach so children get the answer to the problem",
now becomes
"How can I use this problem to help students understand the mathematics"?
Questioning changes in common core:

What is similar about this problem in relation to what we have done before.

Suggested phases of the activity

- Standard
- Objective
- Prior knowledge
- Guiding Questions that help students discuss and reason with the math.
- Activity Steps
- Conclusion - What pieces of knowledge do I want my students to walk away with at the end of the lesson?

ASSESSMENT FOR COMMON CORE

CONSORTIA PREPARING COMMON CORE ASSESSMENT

- PARCC
- SMARTER BALANCED

PARCC has released a set of test specification documents, including assessment blueprints and evidence statement tables, to help educators and the general public better understand the design of the PARCC assessments.

•**Blueprints** are a series of documents that together describe the content and structure of an assessment. These documents define the total number of tasks and/or items for any given assessment component, the standards measured, the item types, and the point values for each

•**Evidence statement tables and evidence statements** describe the knowledge and skills that an assessment item or a task elicits from students. These are aligned directly to the Common Core State Standards, and highlight their advances especially around the coherent nature of the standards.

Overview of Task Types

- The PARCC assessments for mathematics will involve three primary types of tasks: Type I, II, and III.
- Each task type is described on the basis of several factors, principally the purpose of the task in generating evidence for certain sub claims.

Task Type	Description of Task Type
I. Tasks assessing *concepts, skills and procedures*	• Balance of conceptual understanding, fluency, and application • Can involve any or all mathematical practice standards • Machine scorable including innovative, computer-based formats • Will appear on the End of Year and Performance Based Assessment components • Sub-claims A, B and E
II. Tasks assessing *expressing mathematical reasoning*	• Each task calls for written arguments / justifications, critique of reasoning, or precision in mathematical statements (MP.3, 6). • Can involve other mathematical practice standards • May include a mix of machine scored and hand scored responses • Included on the Performance Based Assessment component • Sub-claim C
III. Tasks assessing *modeling / applications*	• Each task calls for modeling/application in a real-world context or scenario (MP.4) • Can involve other mathematical practice standards • May include a mix of machine scored and hand scored responses • Included on the Performance Based Assessment component • Sub-claim D

Assess-ment	Items	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Algebra I	Math I	Geometry	Math II	Algebra II	Math III
EOY	Type I 1 Point	34	28	28	26	24	26	21	19	19	19	19	19
	Type I 2 Point	5	8	8	7	8	5	11	12	12	12	12	14
	Type I 4 Point	-	-	-	1	1	2	3	3	3	3	3	2
EOY TOTAL	Type I	39	36	36	34	33	33	35	34	34	34	34	35
PBA/MYA	Type I 1Point	8	8	6	8	8	10	10	10	10	10	10	10
	Type I 2 Point	2	2	3	2	2	1	-	-	-	-	-	-
	Type II 3 Point	2	2	2	2	2	2	2	2	2	2	2	2
	Type II 4 Point	2	2	2	2	2	2	2	2	2	2	3	3
	Type III 3 Point	2	2	2	2	2	2	2	2	2	2	2	2
	Type III 6 Point	1	1	1	1	1	1	2	2	2	2	3	3
PBA/MYA TOTAL	Type I	10	10	9	10	10	11	10	10	10	10	10	10
	Type II	4	4	4	4	4	4	4	4	4	4	5	5
	Type III	3	3	3	3	3	3	4	4	4	4	5	5

NOT KNOWING YOUR MATH COULD COST YOU $15,000!

SMARTER BALANCED PERFORMANCE ASSESSMENT QUESTION

Gas Bills, Heating Degree Days, and Energy Efficiency

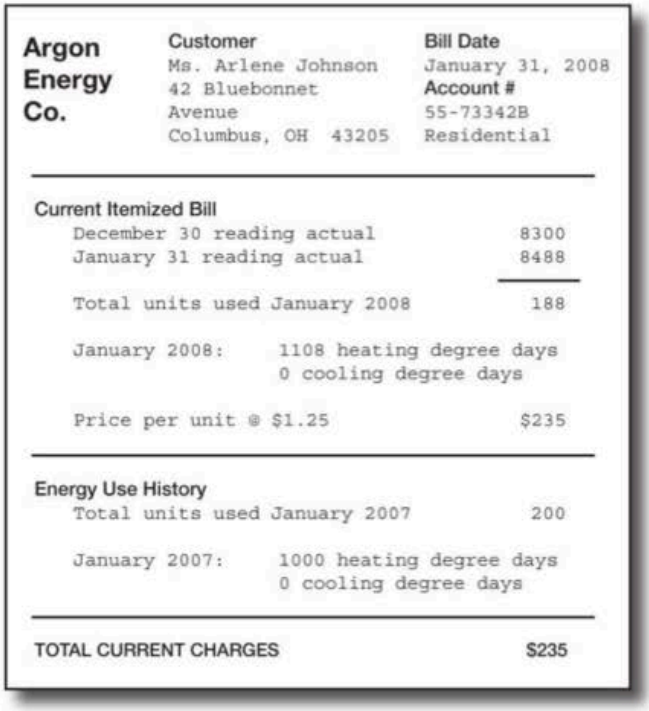
Here is a typical story about an Ohio family concerned with saving money and energy by better insulating their house.

Kevin and Shana Johnson's mother was surprised by some very high gas heating bills during the winter months of 2007. To improve the energy efficiency of her house, Ms. Johnson found a contractor who installed new insulation and sealed some of her windows. He charged her $600 for this work and told her he was pretty sure that her gas bills would go down by "at least 10 percent each year." Since she had spent nearly $1,500 to keep her house warm the previous winter, she expected her investment would conserve enough energy to save at least $150 each winter (10% of $1,500) on her gas bills.

Ms. Johnson's gas bill in January 2007 was $240. When she got the bill for January 2008, she was stunned that the new bill was $235. If the new insulation was going to save only $5 each month, it was going to take a very long time to earn back the $600 she had spent. So she called the insulation contractor to see if he had an explanation for what might have gone wrong. The contractor pointed out that the month of January had been very cold this year and that the rates had gone up from last year. He said her bill was probably at least 10% less than it would have been without the new insulation and window sealing.

Ms. Johnson compared her January bill from 2008 to her January bill from 2007. She found out that she had used 200 units of heat in January of 2007 and was charged $1.20 per unit (total = $240). In 2008, she had used 188 units of heat but was charged $1.25 per unit (total = $235) because gas prices were higher in 2008. She found out the average temperature in Ohio in January 2007 had been 32.9 degrees, and in January of 2008, the average temperature was more than 4 degrees colder, 28.7 degrees. Ms. Johnson realized she was doing well to have used less energy (188 units versus 200 units), especially in a month when it had been colder than the previous year.

Since she used gas for heating only, Ms. Johnson wanted a better estimate of the savings due to the additional insulation and window sealing. She asked Kevin and Shana to look into whether the "heating degree days" listed on the bill might provide some insight.



Argon Energy Co.

Customer	Bill Date
Ms. Arlene Johnson	January 31, 2008
42 Bluebonnet Avenue	Account # 55-73342B
Columbus, OH 43205	Residential

Current Itemized Bill

December 30 reading actual	8300
January 31 reading actual	8488
Total units used January 2008	188
January 2008: 1108 heating degree days, 0 cooling degree days	
Price per unit @ $1.25	$235

Energy Use History

Total units used January 2007	200
January 2007: 1000 heating degree days, 0 cooling degree days	

TOTAL CURRENT CHARGES $235

(*continued*)

a. Assess the cost-effectiveness of Ms. Johnson's new insulation and window sealing. You will need to research on "heating degree days" on the internet. In your response, you must do the following:

- Compare Ms. Johnson's gas bills from January 2007 and January 2008.
- Explain Ms. Johnson's savings after the insulation and sealing.
- Identify circumstances under which Ms. Johnson's January 2008 gas bill would have been at least 10% less than her January 2007 bill.
- Decide if the insulation and sealing work on Ms. Johnson's house was cost-effective and provide evidence for this decision.

Enter response here

Submit

(*continued*)

SMARTER BALANCED Mathematics Summative Assessments
30 to 41 computer adaptive test (CAT) items, depending on grade level.
Selected-response and constructed-response item types.
Technology-enhanced items.

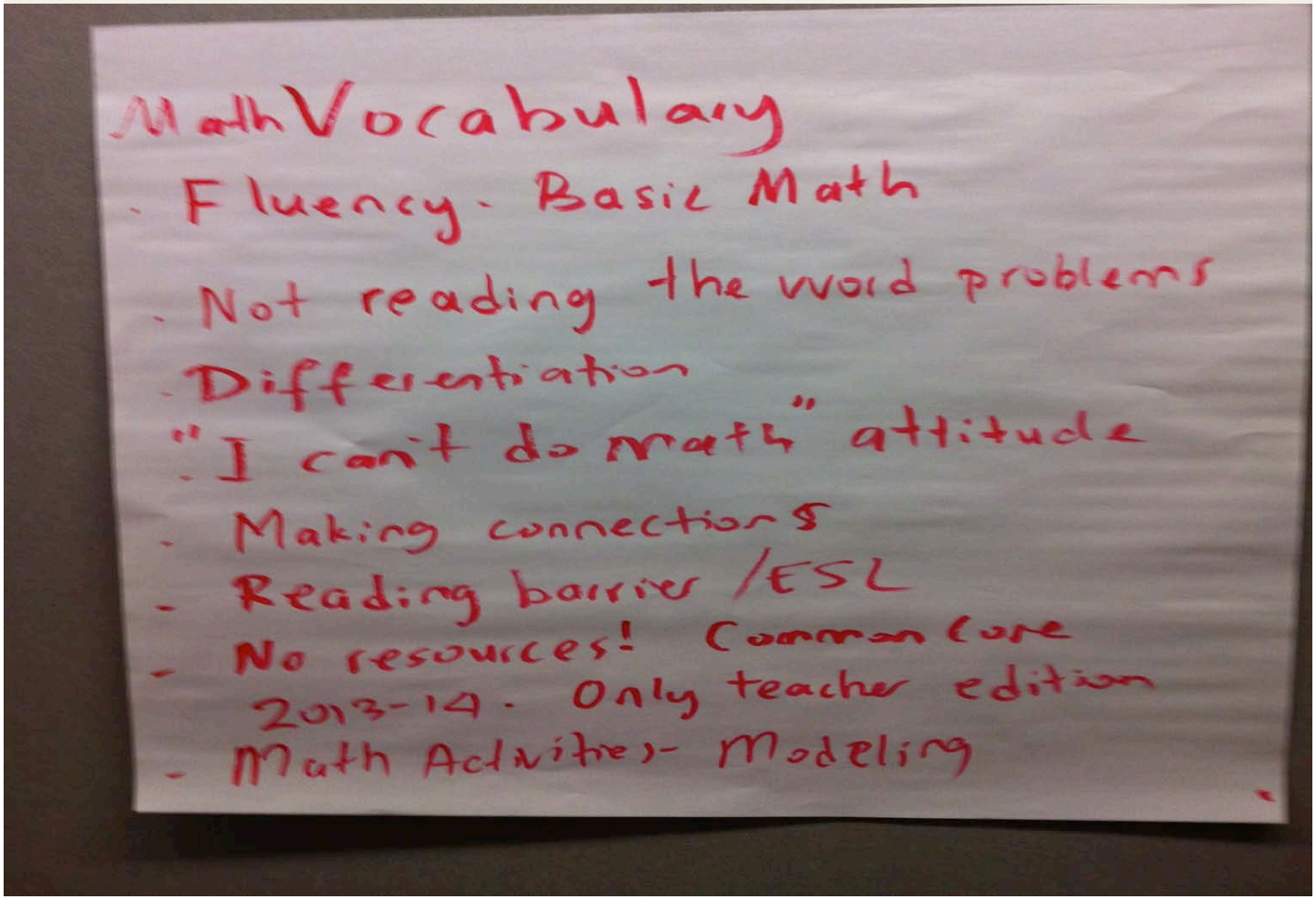
The CAT items will include
- Concepts and Procedures,
- Problem Solving,
- Communicating Reasoning, and
- Modeling and Data Analysis.

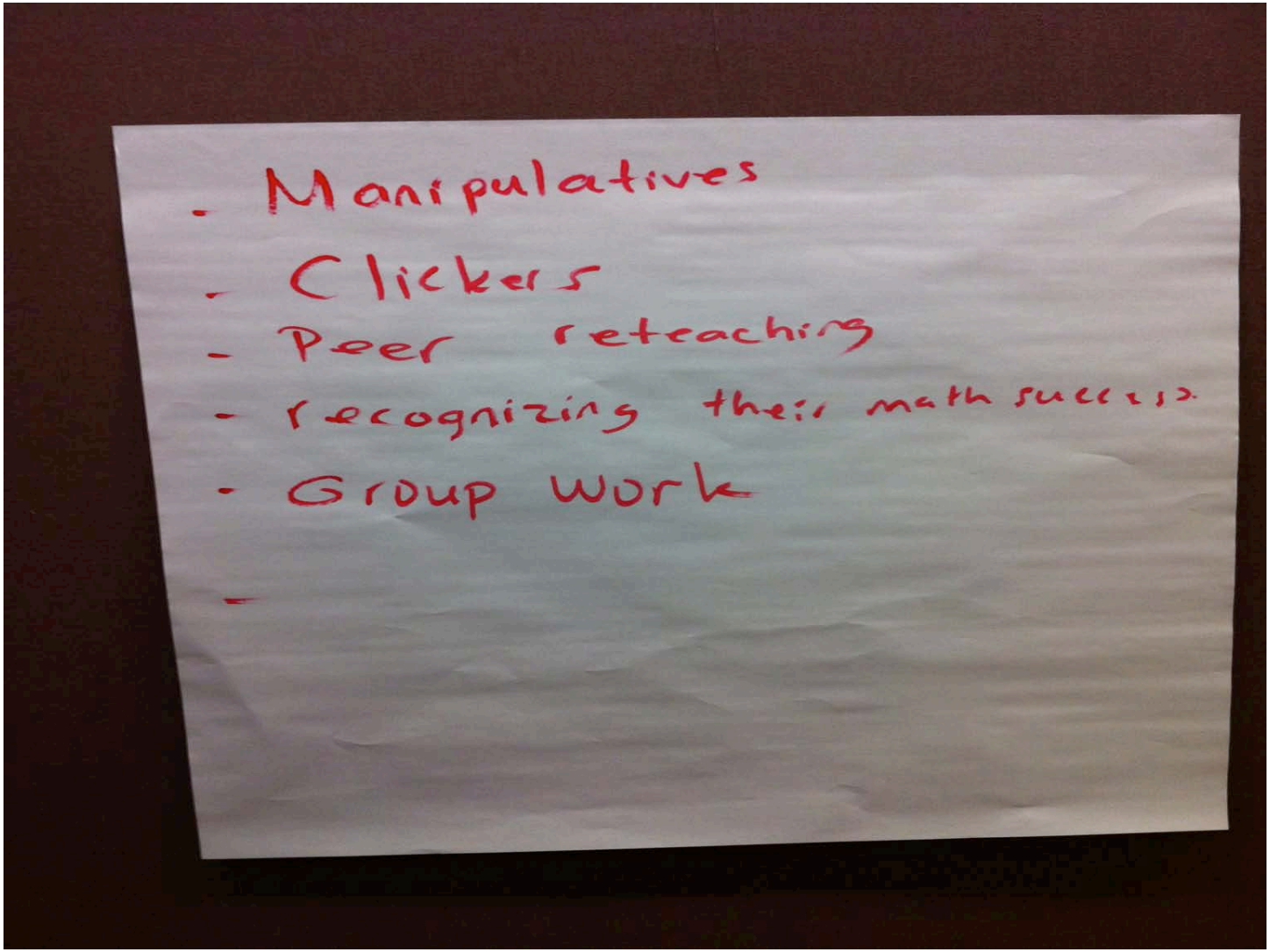
Each assessment will also include one PT(Performance Task)
- Class discussion, small-group work, graphs, charts
- Extended constructed-response item types.

The PTs will focus on Problem Solving, Communicating Reasoning, and Modeling and Data Analysis.

Smarter Balanced FAQ

SURVEY RESULT OF 6-12 GRADES TEACHERS ABOUT THE PROBLEMS THEY OBSERVE IN THEIR CLASSES:




- Manipulatives
- Clickers
- Peer reteaching
- recognizing their math success.
- Group work
-

HIGH QUALITY MATH TEACHERS

- Subject Matter Expertise
- Student Learning
- Diversity of Learners
- Planning Instruction
- Instructional Strategies
- Learning Environment
- Communication
- Assessment
- Professional Development
- Student Support

HIGH QUALITY MATH TEACHERS

Subject Matter Expertise – displays thorough knowledge of material

Student Learning – understands learning and student development

Diversity of Learners – understands differences in how students learn

Planning Instruction – effectively plans based on CS curriculum and Ohio standards

Instructional Strategies – uses a variety of instruction that is engaging and challenging

Learning Environment – creates a positive learning environment for all students

Communication – effectively conveys goals and concepts, verbally and non-verbally

Assessment – uses a variety of ways of evaluating student progress

Professional Development – analyzes past performances and looks for new ways to improve

Student Support – works with parents, families, and students outside of regular classroom time

A study done at the University of Texas found that people remember (Metcalf 1997):

10 percent of what they……..;	**see;**
20 percent of what they ……..;	**do and say**
30 percent of what they ……..;	**say;**
50 percent of what they ……..;	**read;**
70 percent of what they ……..; and	**hear;**
90 percent of what they ……..	**see and hear;**

A study done at the University of Texas found that people remember (Metcalf 1997):

10 percent of what they read;

20 percent of what they hear;

30 percent of what they see;

50 percent of what they see and hear;

70 percent of what they say; and

90 percent of what they do and say

COMMON CORE GAME

http://www.socrative.com/

Join room: **58019ede**

Kids Speak Out on Student Engagement
220 students

1. Working with their peers

"Middle-school students are growing learners who require and want interaction with other people to fully attain their potential."

2. Working with technology

"I believe that when students participate in "learning by doing" it helps them focus more. Technology helps them to do that. Students will always be extremely excited when using technology."

3. Connecting the real world to the work we do/project-based learning

4. Clearly love what you do

"I also believe that enthusiasm in the classroom really makes a student engaged in classroom discussions. Because even if you have wonderful information, if you don't sound interested, you are not going to get your students' attention. I also believe that excitement and enthusiasm is contagious."

5. Get me out of my seat!

"When a student is active they learn in a deeper way than sitting.

6. Bring in visuals

"I like to see pictures because it makes my understanding on a topic clearer. It gives me an image in my head to visualize.“

7. Student choice

"I think having freedom in assignments, project directions, and more choices would engage students...More variety = more space for creativity.“

8. Understand your clients -- the kids

"Encourage students to voice their opinions as you may never know what you can learn from your students.“

9. Mix it up!

"I don't like doing only one constant activity...a variety will keep me engaged in the topic. It's not just for work, but also for other things such as food. Eating the same foods constantly makes you not want to eat!“

10. Be human

"Don't forget to have a little fun yourself."

- https://www.youtube.com/watch?v=jbkSRLYSojo

Funny answers from students!

$$\frac{\sqrt{3}}{3} = \sqrt{}$$

Did you know that 5 out of every 4 people have a problem with fractions?

Funny answers from students!

$$Simplify \quad \frac{\sin x}{n} \qquad\qquad Answer: \quad six$$

Funny answers from students!

Expand $(a + b)^n$.

$(a + b)^n$

$(a + b)^n$

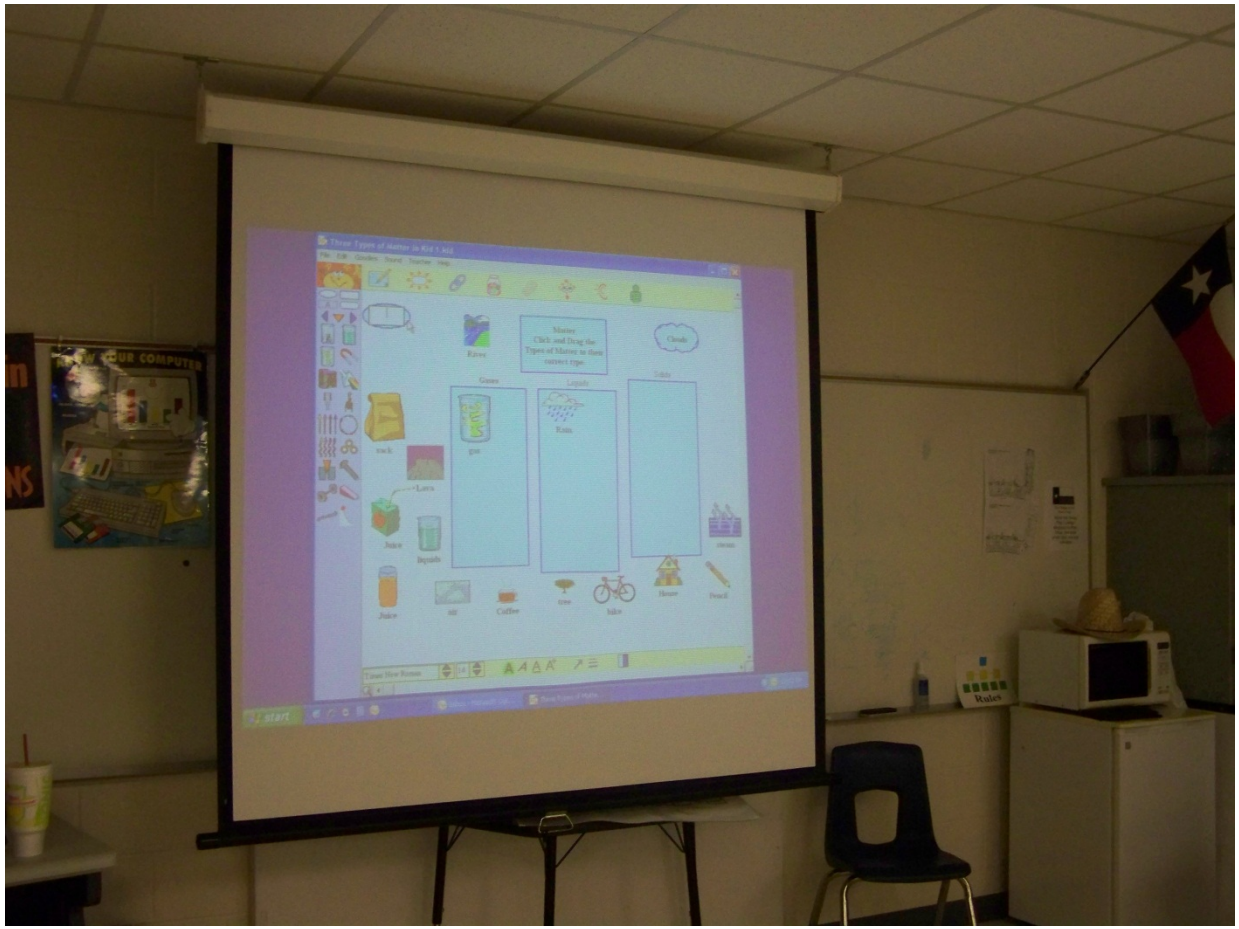
$(a + b)^n$

$(a + b)^n$

There are three types of mathematicians:

Those who can count and those who can't.

Use graphing organizer



What is similar about this problem in relation to what we have done before.

Suggested phases of the activity

- Standard
- Objective
- Prior knowledge
- Guiding Questions that help students discuss and reason with the math.
- Activity Steps
- Conclusion - What pieces of knowledge do I want my students to walk away with at the end of the lesson?

CATEGORY	Average Effect Size	Percentile Gain
Identifying Similarities and Differences	1.61	45
Summarizing and Note taking	1.00	34
Reinforcing effort and providing recognition	0.80	29
Homework and Practice	0.77	28
Cooperative Learning	0.73	27
Setting Objectives and providing feedback	0.73	23
Questions, cues and advance organizers	0.59	22

RESULTS FOR SUMMARIZING STRATEGIES		
SYNTHESIS STUDY	**Average ES**	**Percentile Gain**
Walberg, Rasher	**0.62**	**23**
Crismore	**1.04**	**27**
Rosenshine	**0.88**	**31**
Raphael	**1.80**	**47**

RESULTS FOR NOTE-TAKING		
SYNTHESIS STUDY	**Average ES**	**Percentile Gain**
Henk, Stahl	**1.56**	**44**
Marzano	**1.26**	**40**
Hattie	**1.05**	**35**
Ganske	**0.52**	**20**

GENERAL EFFECTS OF HOMEWORK		
SYNTHESIS STUDY	**Average ES**	**Percentile Gain**
Pascal	**0.36**	**14**
Weinstein	**0.49**	**19**
Hattie	**0.43**	**18**
Ross	**0.65**	**24**

RESEARCH RESULTS FOR GRADED HOMEWORK		
Use of Homework	**Average ES**	**Percentile Gain**
Homework with teachers' comments as feedback	**0.83**	**30**
Graded Homework	**0.78**	**28**
Assigned Homework but not graded or commented	**0.28**	**11**

Establish and Communicate Homework Policy

Design homework assignments that clearly articulate the purpose and outcome.

Vary the approaches to providing feedback.

RESEARCH RESULTS FOR NONLINGUISTIC REPRESENTATION			
	Focus	**Average ES**	**Percentile Gain**
Powell, 1980	**General Nonlinguistic Techniques**	**1.01**	**34**
	General Nonlinguistic Techniques	**1.16**	**38**
	General Nonlinguistic Techniques	**.56**	**21**

Cooperative Learning

RESEARCH RESULTS FOR COOPERATIVE LEARNING			
Study	**Focus**	**Average ES**	**Percentile Gain**
Walberg	**Cooperative learning**	**0.78**	**28**
Lipsey	**Cooperative learning**	**0.63**	**23**
Bosker	**Cooperative learning**	**0.56**	**21**

HOMOGENOUS GROUPING VERSUS NO GROUPING			
Study	**Focus**	**Average ES**	**Percentile Gain**
Slavin	**Ability Grouping**	**0.32**	**12**
Lou	**Low Ability Students**	**0.37**	**14**
Lou	**Medium Ability Students**	**0.19**	**7**
Lou	**High Ability Students**	**0.28**	**11**

HOMOGENOUS GROUPING VERSUS HETEROGENEOUS GROUPING		
Ability Level of Students	**Average ES**	**Percentile Gain**
Low Ability Students	**-0.60**	**-23**
Medium Ability Students	**-0.51**	**19**
High Ability Students	**0.09**	**3**

SIZE OF GROUPS		
Group Size	**Average ES**	**Percentile Gain**
Pairs	**0.15**	**6**
3-4 students	**0.22**	**9**
5-7 students	**-.0.02**	**-1**

- **PROVIDING FEEDBACK:**

1. Feedback should be corrective: It provides students with an explanation of what they are doing that is correct and what they are doing is not correct.

- Simply telling students that their answer on a test is right or wrong has negative effect on achievement.

1. Feedback should be timely: Feedback given immediately after a test-like situation is best.

RESEARCH RESULTS FOR PROVIDING FEEDBACK			
Study	**Focus**	**Average ES**	**Percentile Gain**
Walberg	**General Effects of Feedback**	**0.92**	**32**
Walberg	**General Effects of Feedback**	**0.69**	**25**
Walberg	**General Effects of Feedback**	**0.83**	**30**
Walberg	**General Effects of Feedback**	**0.71**	**26**

RESEARCH RESULTS FOR CORRECTIVE FEEDBACK			
Study	**Focus**	**Average ES**	**Percentile Gain**
Type of Feedback	**Right/wrong answer**	**-0.08**	**-3**
	Correct answer	**0.22**	**9**
	Repeat Until Correct	**0.53**	**20**
	Explanation	**0.71**	**20**

TIMING OF FEEDBACK			
Study	**Focus**	**Average ES**	**Percentile Gain**
Timing of Feedback	**Immediately after item**	**0.19**	**7**
	Immediately after test	**0.72**	**26**
	Delayed after test	**0.56**	**21**
Timing of Test(When to give test)	**Immediately**	**0.17**	**6**
	One day	**0.74**	**27**
	One week	**0.53**	**20**
	Longer	**0.26**	**10**

GREAT ADDITIONAL RESOURCES FOR COMMON CORE

BILL MC CALLUM (Team member who wrote common core)

- http://www.illustrativemathematics.org/standards/k8

PARCC –PLD
Performance Level Descriptors - Smarter Balanced ALD

- http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/11/Smarter-Balanced-Math-ALDs.pdf

- Better lesson

RESOURCES

- ✓ http://www.parcconline.org/
- ✓ http://www.smarterbalanced.org/
- ✓ https://www.illustrativemathematics.org/
- ✓ https://www.engageny.org/
- ✓ http://www.insidemathematics.org/
- ✓ https://www.desmos.com/calculator
- ✓ http://www.brightstorm.com/math/
- ✓ http://betterlesson.com/
- ✓ https://www.khanacademy.org/
- ✓ http://www.problem-attic.com/tour
- ✓ http://www.math.conceptschools.org
- ✓ http://www.**core**standards.org
- ✓ Dave Attendance Application:

Introduction video: http://www.youtube.com/watch?v=ZOQkZemi418&feature=plcp
http://www.youtube.com/channel/UC1cL7NWrCLD4cgV810XMe0w
http://www.dave256apps.com/attendance/