

The Core of the Common Core Learning Standards in Mathematics



COMMON CORE

STATE STANDARDS INITIATIVE

PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER



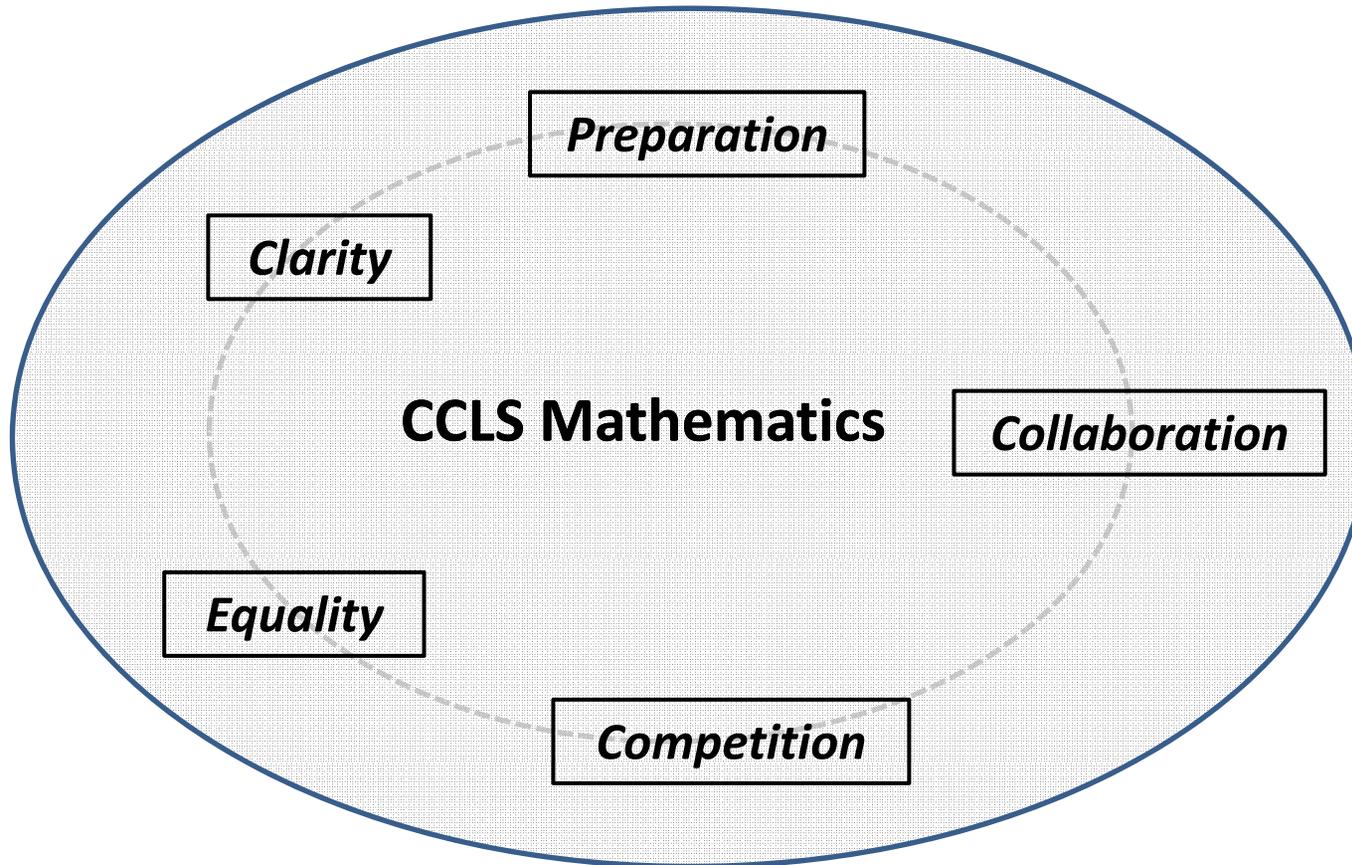
Why Common Core?

These standards define the knowledge and skills students should have within their K-12 education careers so that they will graduate high school able to succeed in entry-level, credit-bearing academic college courses and in workforce training programs. The standards:

- Are aligned with college and work expectations;
- Are clear, understandable and consistent;
- Include rigorous content and application of knowledge through high-order skills;
- Build upon strengths and lessons of current state standards;
- Are informed by other top performing countries, so that all students are prepared to succeed in our global economy and society; and
- Are evidence-based.



Why Common Core?





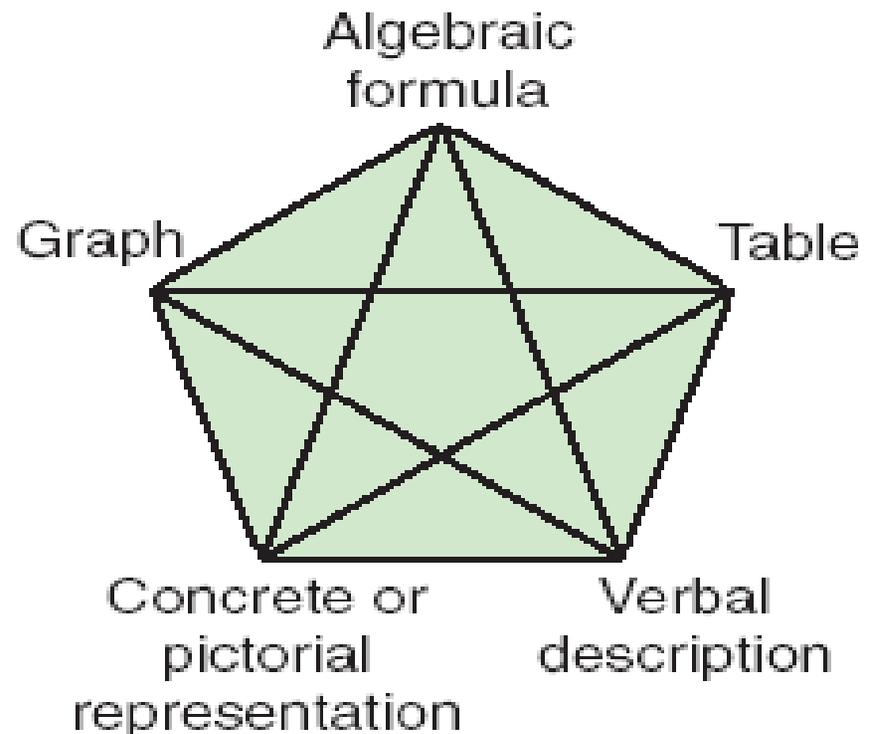
Standards for Mathematical Practice

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.



What are Today's Big Ideas?

- Problem Solving and Reasoning should be a vital part of every mathematics lesson. “Why?” and “How do you know that?” should be the most frequently asked teacher questions.
- There are at least five ways of representing a mathematical concept. Each way can enhance and extend our understanding.



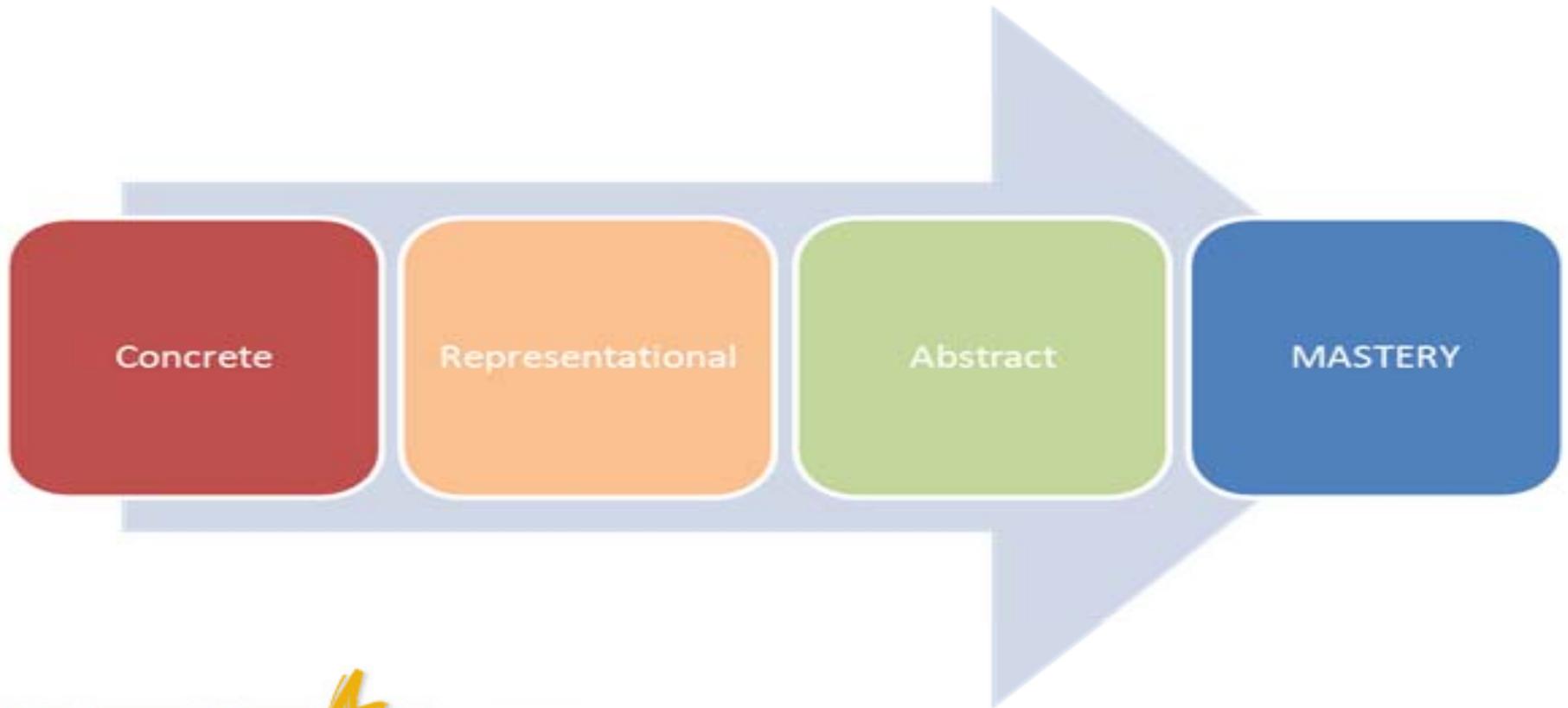


Instructional Shifts for the Common Core in Mathematics

- Focus
- Coherence
- Fluency
- Deep Understanding
- Applications
- Dual Intensity



A Continuum of Learning in Mathematics





C.R.A.

C...Concrete;

Lesson uses manipulatives; builds; hands on;
uses movements; connects to the real world.

R...Representative / Pictorial;

Lesson uses pictures; words; diagrams and numbers; shows how the
student sees the concept.

A...Abstract;

Lesson uses an algorithm; symbol manipulation; student knows the
rule.

All concepts are taught to **MASTERY**



Investigations Through Games

- Foster experiential learning
- Different modalities utilized
- Incorporate the continuum of learning (CRA) to facilitate deeper understanding and mastery
- Allows students to construct meaning



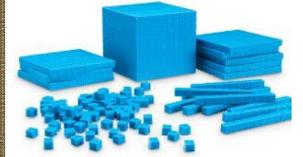
Common Core Learning Standards Addressed:

- **K.G.1:** Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.
- **K.G.2:** Correctly name shapes regardless of their orientations or overall size.
- **K.G.4:** Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/ "corners") and other attributes (e.g., having sides of equal length).



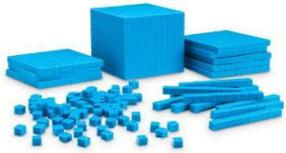
“What’s Another Way?”

(Grades 1 & 2)



Common Core Learning Standards Addressed:

- **1.NBT.2:** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
 - a. 10 can be thought of as a bundle of ten ones — called a “ten.”
 - b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
 - c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).



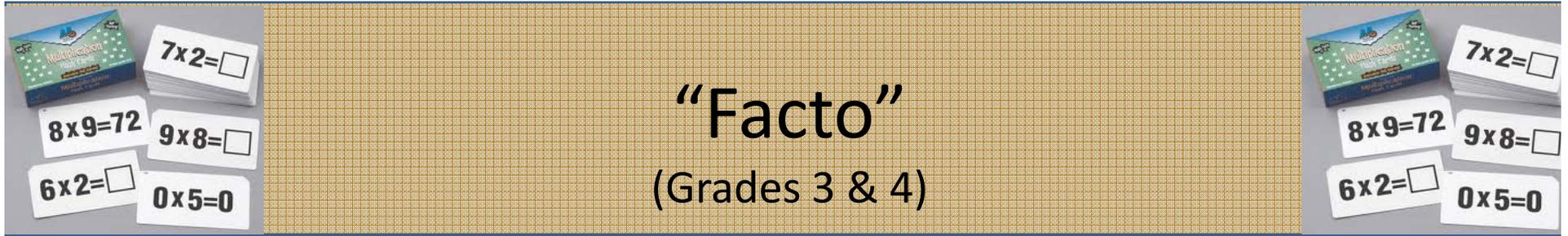
“What’s Another Way?”

(Grades 1 & 2)



Common Core Learning Standards Addressed:

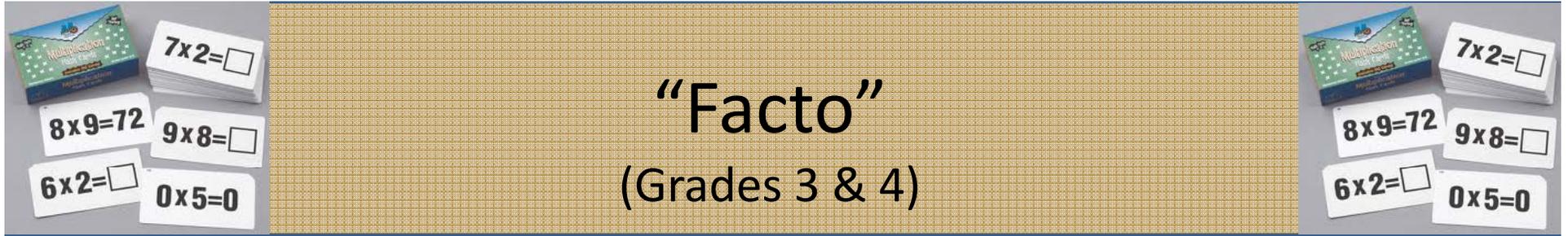
- **2.NBT.1:** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e. g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
 - a. 100 can be thought of as a bundle of ten tens — called a “hundred.”
 - b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).



Common Core Learning Standards Addressed:

- **3.OA.5: Understand properties of multiplication and the relationship between multiplication and division.**

Apply properties of operations as strategies to multiply and divide. 2 *Examples:*
If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property)



Common Core Learning Standards Addressed:

- **4.OA.4: Gain familiarity with all factors and multiples.**

Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number.

Determine whether a given whole number in the range 1–100 is prime or composite.



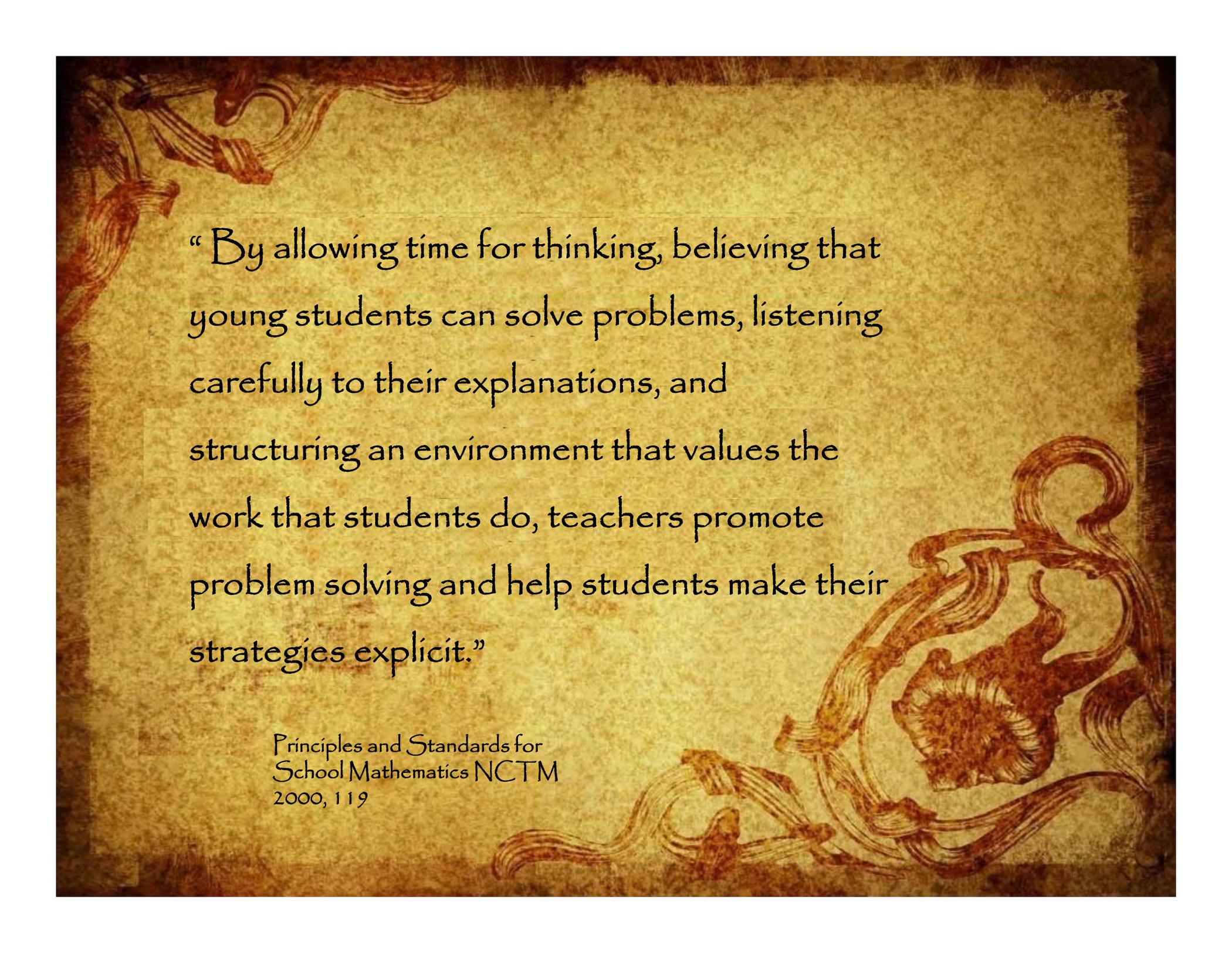
“Trash Can Slam”

(Grades 5 & 6)



Common Core Learning Standards Addressed:

- **5.NF.1:** Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)*
- **6.RP.3: Understand ratio concepts and use ratio reasoning to solve problems.**
 - c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.



“By allowing time for thinking, believing that young students can solve problems, listening carefully to their explanations, and structuring an environment that values the work that students do, teachers promote problem solving and help students make their strategies explicit.”

Principles and Standards for
School Mathematics NCTM
2000, 119