Dr. John D. Barge, State School Superintendent
"Making Education Work for All Georgians"

Common Core Georgia Performance Standards

Fourth Grade

Turtle Gunn Toms
Elementary Mathematics Specialist

Brooke Kline
Secondary Mathematics Specialist

Dr. John D. Barge, State School Superintendent
"Making Education Work for All Georgians"

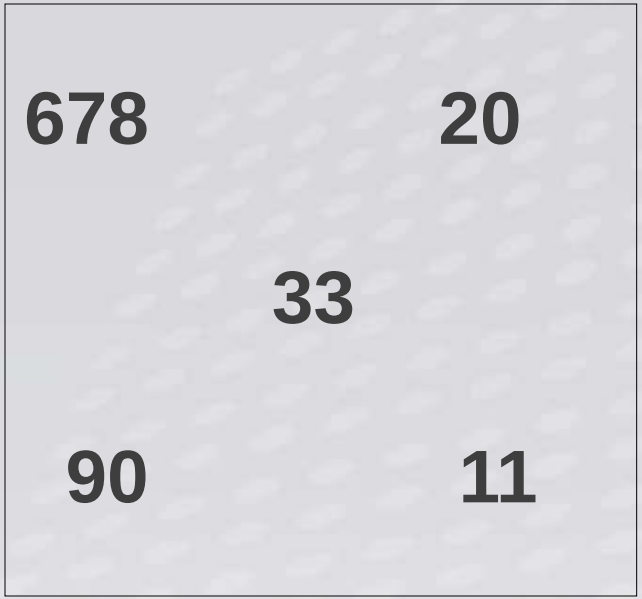
Thank you for being here today.

You will need the following materials during today's broadcast:

- Fourth Grade handouts/resource packet
- Pattern blocks, color tiles, graph paper
- Note-taking materials

(This session is being recorded, and all materials, including the powerpoint, are available for download)

Activate your brain



- **Area code**
- **Gallons of water to fill the tub**
- **Number of ducks I've owned**
- **Miles to my mom's house**
- **Number of homes I've lived in**

Number sense builds on students' natural insights and convinces them that mathematics makes sense, that it is not just a collection of rules to be applied.

Hilde Howden, 1989

Why Common Core Standards?

- Preparation: The standards are college- and career-ready. They will help prepare students with the knowledge and skills they need to succeed in education and training after high school.
- Competition: The standards are internationally benchmarked. Common standards will help ensure our students are globally competitive.
- Equity: Expectations are consistent for all – and not dependent on a student's zip code.

Why Common Core Standards?

- Clarity: The standards are focused, coherent, and clear. Clearer standards help students (and parents and teachers) understand what is expected of them.
- Collaboration: The standards create a foundation to work collaboratively across states and districts, pooling resources and expertise, to create curricular tools, professional development, common assessments and other materials.

Common Core State Standards

Building on the strength of current state standards, the CCSS are designed to be:

- Focused, coherent, clear and rigorous
- Internationally benchmarked
- Anchored in college and career readiness
- Evidence and research based

Common Core State Standards in Mathematics

K	1	2	3	4	5	6	7	8	9 - 12
Measurement and Data						Statistics and Probability			Statistics and Probability
Counting and Cardinality		Number and Operations Fractions				Ratios & Proportional Relationships	F		Functions
Number and Operations in Base Ten						The Number System			Number and Quantity
Operations and Algebraic Thinking						Expressions and Equations			Algebra
Geometry									Geometry
									Modeling

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Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
6. Attend to precision.

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others

Reasoning and explaining

4. Model with mathematics.
5. Use appropriate tools strategically.

Modeling and using tools

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

Seeing structure and generalizing

(McCallum, 2011)

Geometry ← Domain

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Standards
CLUSTER Heading

Standards

- **MCC4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.**
- **MCC4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.**

While the standards focus on what is most essential, they do not describe all that can or should be taught. A great deal is left to the discretion of teachers and curriculum developers. The aim of the standards is to articulate the fundamentals, not to set out an exhaustive list or a set of restrictions that limits what can be taught beyond what is specified.

corestandards.org

So what's a Fourth Grade teacher to do?

- Read your grade level standards. Use the CCGPS Teaching Guide found on georgiastandards.org and in Learning Village.
- Discuss the standards with your colleagues.

Fourth Grade Curriculum Map

Common Core Georgia Performance Standards: Curriculum Map							
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8
Whole Numbers, Place Value and Rounding in Computation	**Fraction Equivalents**	**Adding and Subtracting Fractions**	**Multiplying and Dividing Fractions**	**Fractions and Decimals**	**Geometry**	**Measurement**	**Show What We Know**
MCC4.NBT.1 MCC4.NBT.2 MCC4.NBT.3 MCC4.NBT.4 MCC4.NBT.5 MCC4.NBT.6 MCC4.OA.1 MCC4.OA.2 MCC4.OA.3 MCC4.OA.4 MCC4.OA.5	MCC4.NF.1 MCC4.NF.2 MCC4.OA.1 MCC4.OA.4	MCC4.NF.3	MCC4.NF.4	MCC4.NF.5 MCC4.NF.6 MCC4.NF.7	MCC4.G.1 MCC4.G.2 MCC4.G.3	MCC4.MD.1 MCC4.MD.2 MCC4.MD.3 MCC4.MD.4 MCC4.MD.5 MCC4.MD.6 MCC4.MD.7	ALL
These units were written to build upon concepts from prior units, so later units contain tasks that depend upon the concepts addressed in earlier units. All units will include the Mathematical Practices and indicate skills to maintain.							

NOTE: Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.

Fourth Grade Overview

Unit 1: Whole Numbers, Place Value and Rounding in Computation

- MCC4.NBT.1
- MCC4.NBT.2
- MCC4.NBT.3
- MCC4.NBT.4
- MCC4.NBT.5
- MCC4.NBT.6
- MCC4.OA.1
- MCC4.OA.2
- MCC4.OA.3
- MCC4.OA.4
- MCC4.OA.5

Number and Operations in Base Ten

•Generalize place value understanding for multi-digit whole numbers.

•Use place value understanding and properties of operations to perform multi-digit arithmetic.

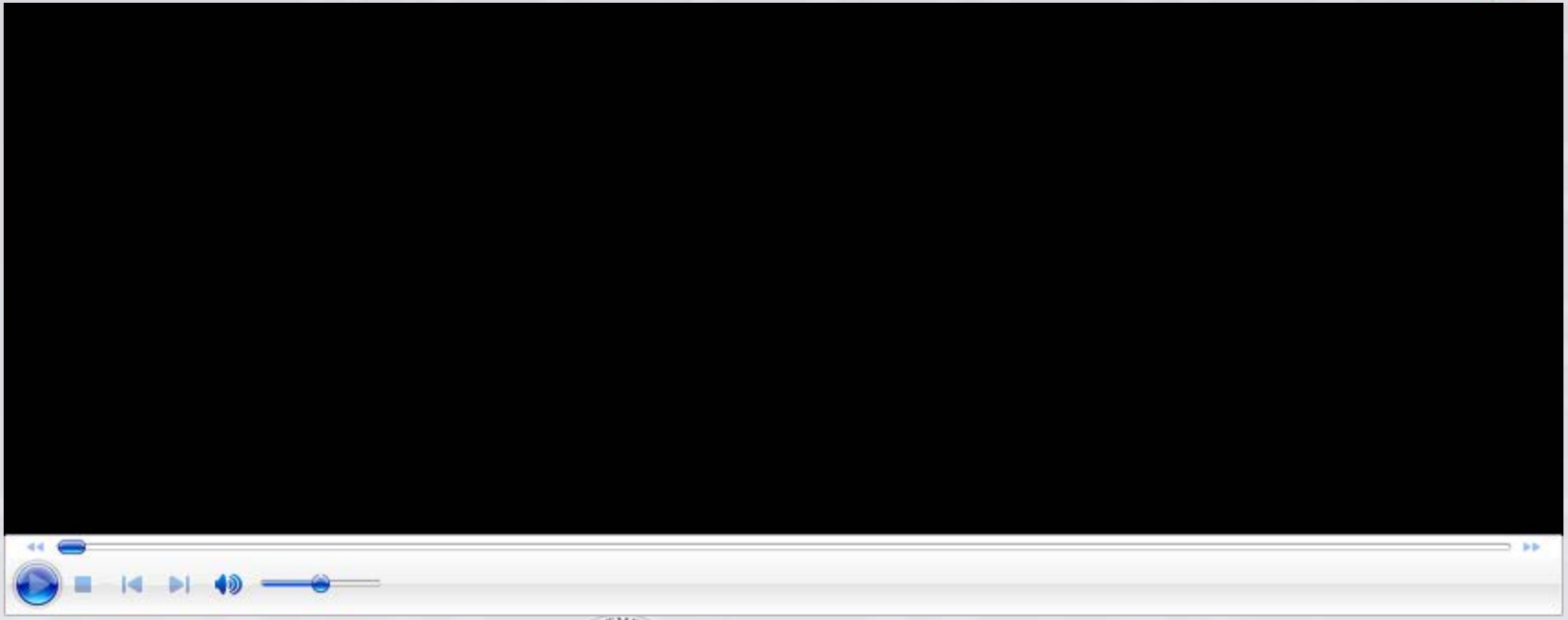
Operations and Algebraic Thinking

•Use the four operations with whole numbers to solve problems.

•Gain familiarity with factors and multiples.

•Generate and analyze patterns.

Student Understanding?



Fourth Grade Overview

Unit 2: Fraction Equivalents

- MCC4.NF.1
- MCC4.NF.2
- MCC4.OA.1
- MCC4.OA.4

Number and Operations, Fractions

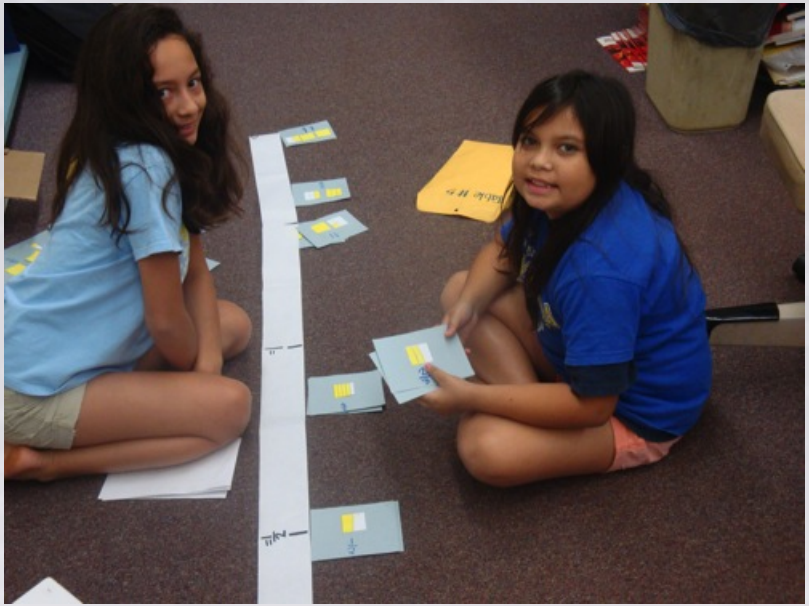
•Extend understanding of fraction equivalence and ordering.

Operations and Algebraic Thinking

•Use the four operations with whole numbers to solve problems.

•Gain familiarity with factors and multiples.

Student Understanding?



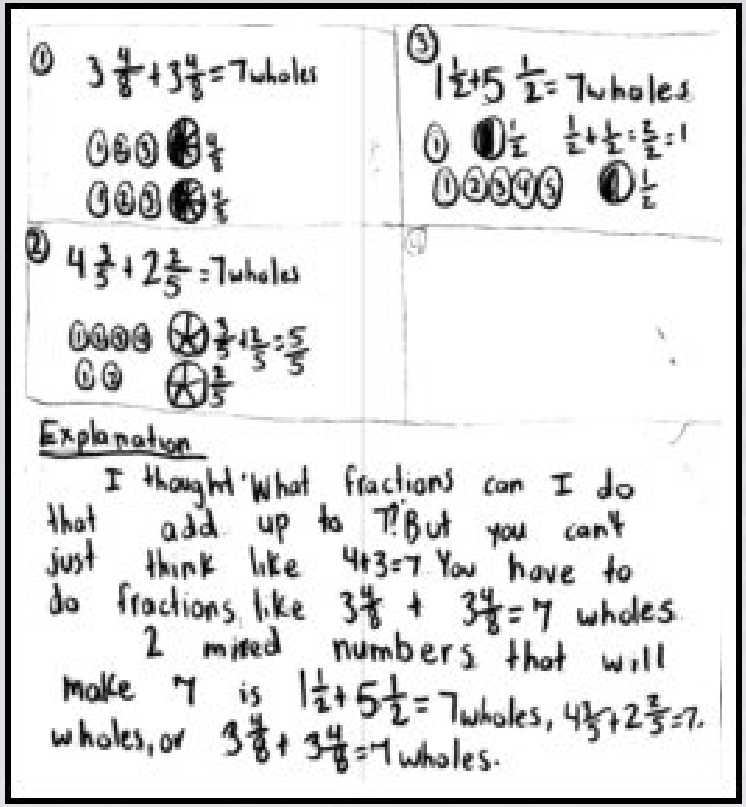
Fourth Grade Overview

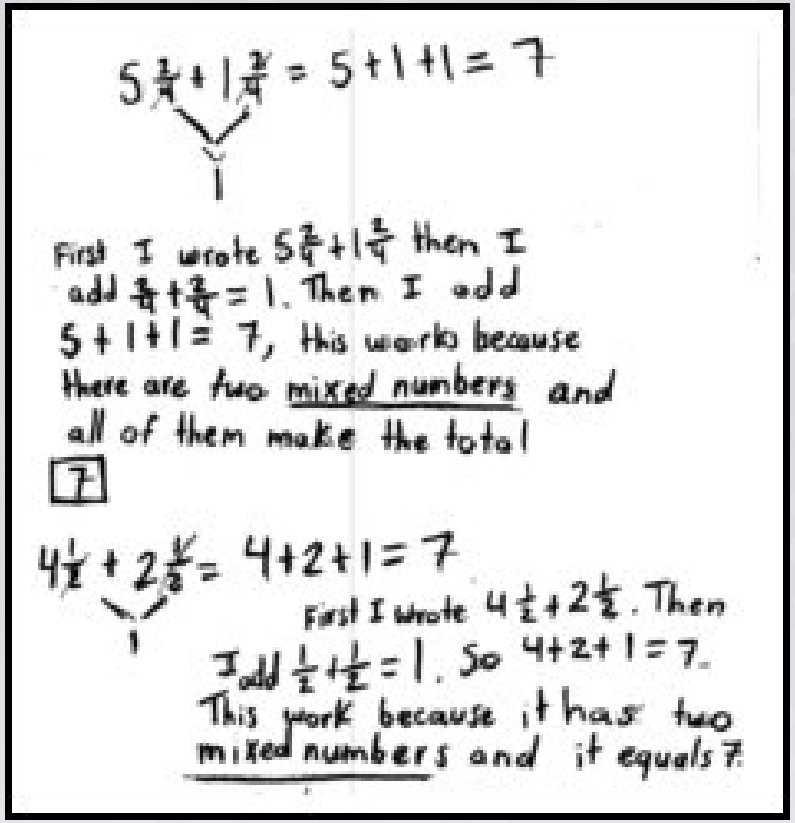
Unit 3: Adding and Subtracting Fractions

- **MCC4.NF.3**

Number and Operations, Fractions

•Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.


① $3\frac{4}{8}+3\frac{4}{8}=7$ wholes
③ $1\frac{1}{2}+5\frac{1}{2}=7$ wholes
② $4\frac{3}{5}+2\frac{2}{5}=7$ wholes
Explanation
I thought 'What fractions can I do that add up to 7' But you can't just think like 4+3=7 You have to do fractions like $3\frac{4}{8}+3\frac{4}{8}=7$ wholes 2 mixed numbers that will make 7 is $1\frac{1}{2}+5\frac{1}{2}=7$ wholes, $4\frac{3}{5}+2\frac{2}{5}=7$ wholes, or $3\frac{4}{8}+3\frac{4}{8}=7$ wholes.


$5\frac{3}{4}+1\frac{3}{4}=5+1+1=7$
First I wrote $5\frac{3}{4}+1\frac{3}{4}$ then I add $\frac{3}{4}+\frac{3}{4}=1$. Then I add $5+1+1=7$, this works because there are two mixed numbers and all of them make the total
7
$4\frac{1}{2}+2\frac{1}{2}=4+2+1=7$
First I wrote $4\frac{1}{2}+2\frac{1}{2}$. Then I add $\frac{1}{2}+\frac{1}{2}=1$. So $4+2+1=7$. This work because it has two mixed numbers and it equals 7.

Journaling

- Every day
- Provide a rubric (look online, then refine)
- Teach organization
- 3 stages- familiarization, mathematization, induction

Fourth Grade Overview

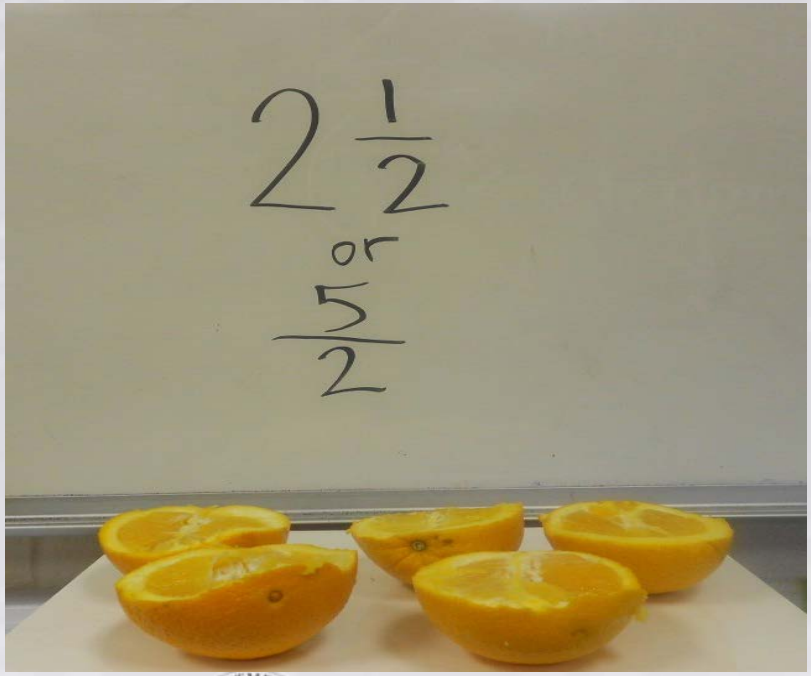
Unit 4: Multiplying and Dividing Fractions

- **MCC4.NF.4**

Number and Operations, Fractions

•Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Multiplying Fractions



Fourth Grade Overview

Unit 5: Fractions and Decimals

MCC4.NF.5
MCC4.NF.6
MCC4.NF.7

Number and Operations, Fractions
•Understand decimal notation for fractions, and compare decimal fractions.

Fourth Grade Overview

Unit 6: Geometry

- **MCC4.G.1**
- **MCC4.G.2**
- **MCC4.G.3**

Geometry

•Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Fourth Grade Overview

Unit 7: Measurement

- MCC4.MD.1
- MCC4.MD.2
- MCC4.MD.3
- MCC4.MD.4
- MCC4.MD.5
- MCC4.MD.6
- MCC4.MD.7

Measurement and Data

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data
- Geometric Measurement: understand concepts of angle and measure angles.

Fourth Grade Overview

Unit 8: Show What We Know

What's Different in Fourth Grade?

Operations and Algebraic Thinking

- Classification of counting numbers into subsets

Number and Operations in Base Ten

- Relative magnitude
- Rounding to 1,000,000
- Fluency in addition and subtraction with standard algorithm- dependent upon all reasoning strategies
- Strategy-based division

Number and Operations- Fractions

- A fraction a/b is equivalent to a fraction (nxa)/(nxb) (with models!)
- Compare fractions using benchmark fractions
- Multiply a fraction by a whole number

What's Different in Fourth Grade

Measurement and Data

- Relative sizes within one system of units (length, weight, volume, time, and angles)
- Word problems involving distance, time, liquid volume, masses of objects, money
- Use of a number line to represent measurement quantities
- Area and perimeter

Geometry

- Draw points, lines, line segments, rays, angles, and perpendicular and parallel lines. Identify these in two-dimensional figures
- Symmetry

Common Misconceptions

Operations and Algebraic Thinking

- Not listing the number itself when listing multiple.
- Larger number means more factors
- Key words

Number and Operations in Base Ten

- Writing numerals incorrectly from verbal descriptions
- The first digit of a multi-digit number indicates the "greatness" of a number.
- Mixing up when to 'carry' and when to 'borrow'.
- Taking the smaller digit from the larger one.

Common Misconceptions

Number and Operations- Fractions

- Inconsistent models when performing operations on fractions.
- Treating decimals as whole numbers when making comparisons.
- Incorrect creation of equivalent fractions.

Measurement

- Larger units mean larger measure.
- Whole-number names when counting fractional parts on a number line.
- Protractor confusion.

Geometry

- Side length affects angle measure.

Focus
Coherence
Fluency
Deep Understanding
Applications
Balanced Approach

Focus

Coherence

Fluency

Deep Understanding

Applications

Balanced Approach

Focus

The student…

- spends more time thinking and working on priority concepts.
- is able to understand concepts and their connections to processes (algorithms).

Focus

The teacher...

- builds knowledge, fluency, and understanding of why and how certain mathematics concepts are done.
- thinks about how the concepts connect to one another.
- pays more attention to priority content and invests the appropriate time for all students to learn before moving onto the next topic.

Grade	Priorities in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K–2	Addition and subtraction, measurement using whole number quantities
3-5	Multiplication and division of whole numbers and fractions
6	Ratios and proportional reasoning; early expressions and equations
7	Ratios and proportional reasoning; arithmetic of rational numbers
8	Linear algebra
9-12	Modeling

Critical Areas

In Fourth Grade, instructional time should focus on **three critical areas:**

- Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends
- Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers
- Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry

Sample high leverage task

Pattern Block Fractions

What is no longer in Fourth Grade ?

What about

- Decimals- only to hundredths?
- Common fraction/decimal fraction

Focus

Coherence

Fluency

Deep Understanding

Applications

Balanced Approach

Coherence

The student…

- builds on knowledge from year to year, in a coherent learning progression.

Coherence

The teacher……

- connects mathematical ideas across grade levels.
- thinks deeply about what is being focused on.
- thinks about the way those ideas connect to how they were taught the year before and the years after.

What do Fourth Grade students bring? What are they connecting to later?

From 3 to 4

- Deep understanding of addition and subtraction strategies (within 1000)
- Developing understanding of multiplication and division (products within 100)
- Useful place value understanding.
- Understanding of defining attributes about shape, comparison of shape.
- Foundational fractional relationships.
- Continuation of fluency/algebraic thinking.
- Measurement/addition/subtraction relationships
- Data analysis

Later

- Deep understanding of addition and subtraction, multiplication and division.
- Useful place value understanding.
- Understanding of defining attributes about shape, comparison of shape.
- Foundational fractional relationships, fraction operations.
- Continuation of fluency/algebraic thinking.
- Measurement/addition/subtraction/fraction relationships
- Data analysis

Sample Coherence Task

Pattern Block Angles

Using your understanding of a square, use this paper plate and pattern blocks to determine the angles found on each pattern block.

Again, where is it all going?

- Deep understanding of addition and subtraction.
- Useful place value understanding.
- Understanding of defining attributes about shape, comparison of shape.
- Foundational fractional relationships, operations.
- Continuation of fluency, algebraic thinking.
- Measurement/addition/subtraction/fraction relationships
- Data analysis

Focus
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Fluency

The student…

- spends time practicing skills with intensity and frequency.

Fluency

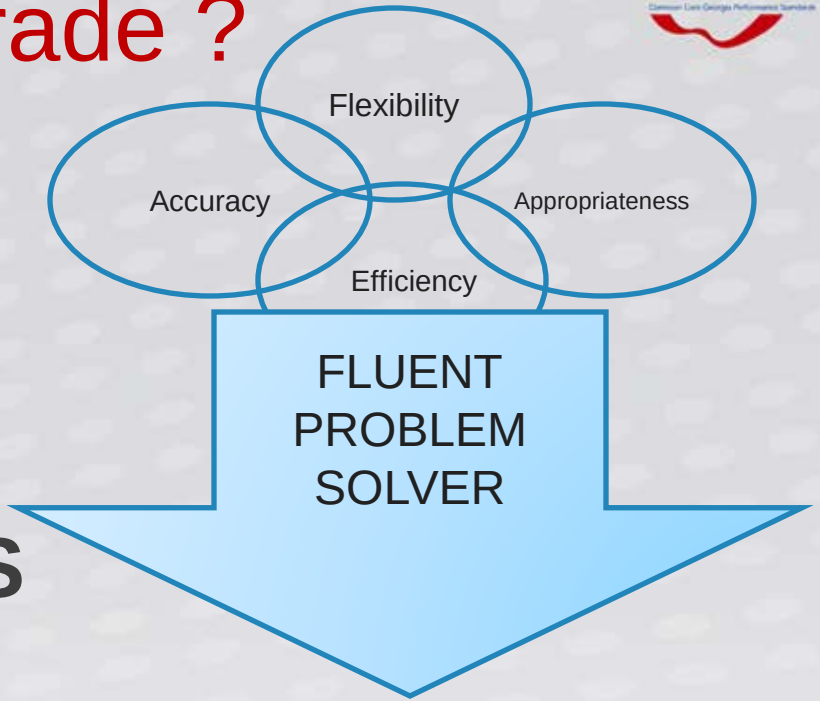
The teacher...

- pushes students to know basic skills at a greater level of fluency based on understanding.
- focuses on the listed fluencies by grade level.

Grade	Required Fluency
K	Add/subtract within 5
1	Add/subtract within 10
2	Add/subtract within 20 & Add/subtract within 100 (pencil and paper)
3	Multiply/divide within 100 & Add/subtract within 1000
4	Add/subtract within 1,000,000
5	Multi-digit multiplication
6	Multi-digit division & Multi-digit decimal operations
7	Solve $px + q = r$, $p(x + q) = r$
8	Solve simple 2×2 systems by inspection
9-12	Algebraic manipulation in which to understand structure. Writing a rule to represent a relationship between two quantities. Seeing mathematics as a tool to model real-world situations. Understanding quantities and their relationships.

What does Fluency Look Like in Fourth Grade ?

- **FLEXIBILITY**
- **ACCURACY**
- **EFFICIENCY**
- **APPROPRIATENESS**



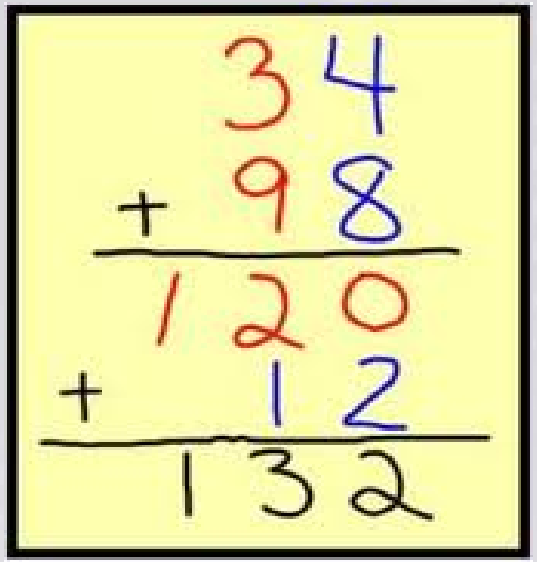
What does Fluency Look Like in Fourth Grade ?

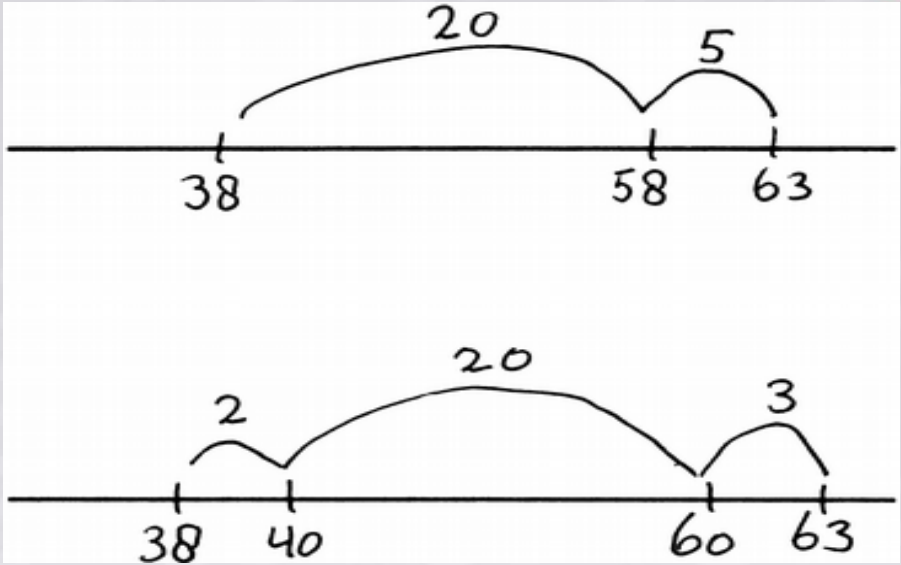
MCC4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Build fluency using:
- Place value
- Strategy development
- Explaining thinking
- Number talks

Build memory using:
- games, games, games
- Application in meaningful tasks

Standard Algorithms





Let's play a game

Clear the Board

(Thanks, Mike- love this game, too!)

Focus
Coherence
Fluency
Deep Understanding
Applications
Balanced Approach

Deep Understanding

The student…

- shows mastery of material at a deep level in numerous ways.
- uses mathematical practices to demonstrate understanding of different material and concepts.

Deep Understanding

The teacher...

- asks self what mastery/proficiency really looks like and means.
- plans for progressions of levels of understanding.
- spends the time necessary to gain the depth of the understanding.
- becomes flexible and comfortable in own depth of content knowledge.

Deep Understanding Sample Task

The Factor Game

Take a look at the task, and think about this:

- How do we get started?
- What might students do?
- What should teachers do?
- How should it end?
- Where is it going?

Task Structure

- Pre-Assessment/Opening
- Collaborative activity
- Whole-class discussion
- Return to the pre-assessment/opening and bring it all back to the standards

Focus
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Application

The student…

- applies mathematics in other content areas and situations.
- chooses the right mathematics concept to solve a problem when not necessarily prompted to do so.

Application

The teacher...

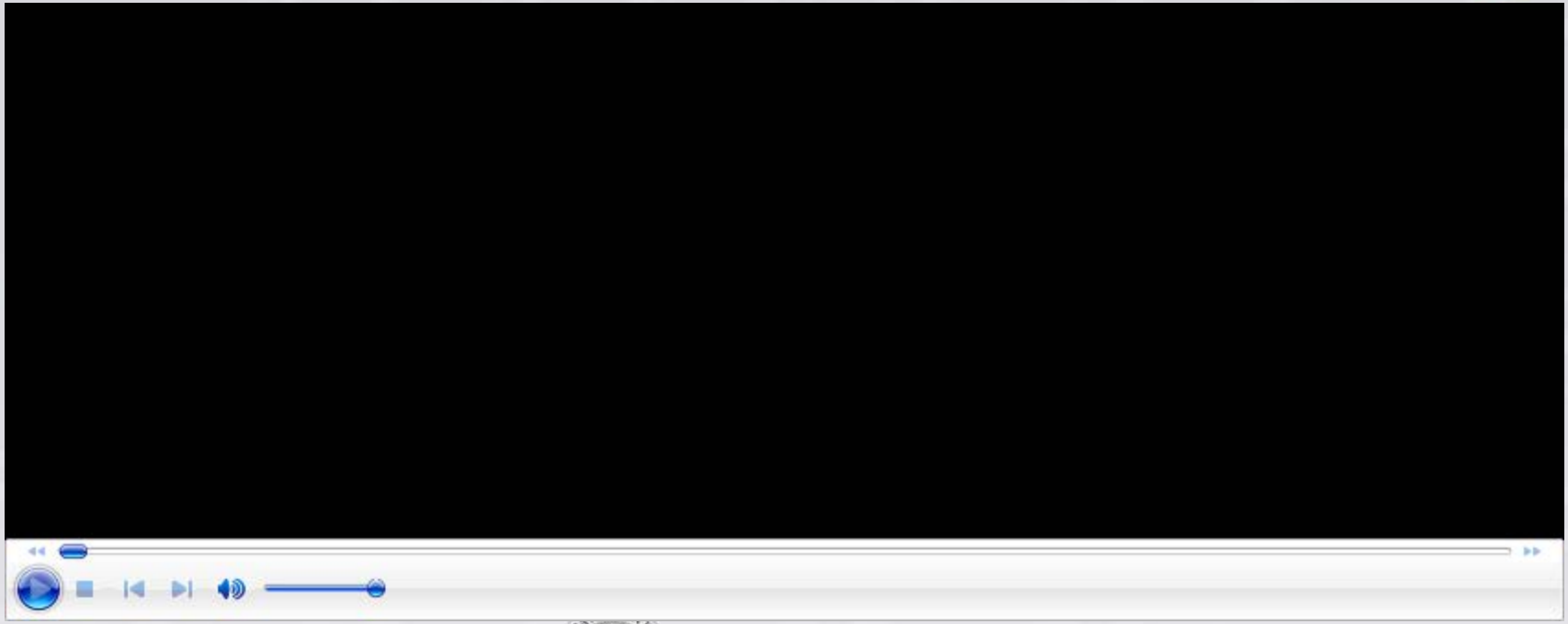
- contextualizes mathematics.
- creates real world experiences in which students use what they know, and in which they are not necessarily prompted to apply mathematics.

Mathematizing Fourth Grade

What does it mean to apply mathematics in Fourth Grade ?

- Attendance
- Lunch count
- Science, Social Studies, ELA
- Counting, measuring, sorting, classifying, describing everything!
- Contextualizing math

What does this mean in terms of assessment?



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Balanced Approach

The student…

- practices mathematics skills to achieve fluency.
- practices math concepts to ensure application in novel situations.

Balanced Approach

The teacher...

- finds the balance between understanding and practice.
- normalizes the productive struggle.
- ritualizes skills practice.

What does balance mean in Fourth Grade ?

Ms. Guy's Puppy Problem

Ms. Guy has a very energetic puppy. The puppy loves to play outdoors, so Ms. Guy decided to build a pen to allow her pet to be outside while she is at school. She just happens to have 50 feet of fencing in her basement that she can use for the pen.

What are some of the ways she can set up the pen that uses all the fencing?

What are the dimensions of the rectangular pen with the most space available for the puppy to play?

Used with permission of Exemplars.com (Thanks, Ross!)

How could we launch this task?

- Diagnostic- look for potential misconceptions
- Cubes, color tiles, bead bars, counters
- Grid paper, rulers

Focus
Coherence
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CCGPS Suggestions:

1. Read the CCGPS. The Teaching Guide for next year, curriculum maps and the standards can be found in Learning Village, on the math program page, and on Georgiastandards.org.
2. View the Fall 2011 Grade Level Webinars if you haven't already seen them. (available on GSO)
3. Review this broadcast with your team to identify key areas of focus.

CCGPS Suggestions:

4. Participate in the unit-by-unit webinars beginning in May.

   Fourth Grade Unit 1- 3:15, May 9, 2012.

5. Structure time for grade level/content areas to use framework units as a guide for planning.

6. Plan to get together with your colleagues at the end of each CCGPS unit to analyze student work samples and compare how student learning and performance look.

Fourth Grade Support:

Now-

- Fall 2011 Grade Level Webinars
- Teaching Guide
- Curriculum map
- Standards document

Coming soon-

- Frameworks units- posting in April, 2012
- Unit-by-unit webinars:

Fourth Grade Unit 1, 3:15 pm, May 9, 2012

Takeaways?

3 Things-

1. What's new?
2. What's different?
3. What resources and support are available for CCGPS mathematics?

Food for Thought

"The resources we need in order to grow as teachers are abundant within the community of colleagues. Good talk about good teaching is what we need…"

Parker Palmer
Courage to Teach

THANK YOU

Turtle Gunn Toms
tgunn@doe.k12.ga.us

Thank you for participating in this CCGPS Professional Learning Session. We value your feedback. Please go to the following website, take the anonymous feedback survey, and complete the participation log to receive a certificate of participation:

http://survey.sedl.org/efm/wsb.dll/s/1g10a

If you have questions, feel free to contact any of the English/Language Arts or Mathematics staff at the following email addresses:

Sandi Woodall, Georgia Mathematics Coordinator
swoodall@doe.k12.ga.us

James Pratt, Secondary Mathematics
jpratt@doe.k12.ga.us

Brooke Kline, Secondary Mathematics
bkline@doe.k12.ga.us

Turtle Gunn Toms, Elementary Mathematics
tgunn@doe.k12.ga.us

Kim Jeffcoat, Georgia ELA Coordinator
kjeffcoat@doe.k12.ga.us

Susan Jacobs, Secondary ELA
sjacobs@doe.k12.ga.us

Sallie Mills, Elementary ELA
smills@doe.k12.ga.us

Andria Bunner, Elementary ELA
abunner@doe.k12.ga.us

Dr. John D. Barge, State School Superintendent
"Making Education Work for All Georgians"