MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the curriculum

Grades K–5

The goal of the initiative

Image credit: Chad Baker/Jason Reed/Ryan McVay/Photodisc/Thinkstock

Improve the quality of instruction in math classrooms by developing deep mathematical content knowledge of teachers and connecting that content knowledge to the practical implementation of a quality curriculum.

Math Content Module 1
Grades K–5

2

Group norms

- Understand that those who work, learn.
- Look for solutions, not blame.
- Focus on systems, not people.
- Recognize that everyone has expertise.
- Be honest.
- Challenge ideas.
- Share talk time.
- Mistakes are expected, respected, and inspected.

3

Module 1 goals

Participants will…

- Examine the project overview and intended outcomes for content modules.
- Identify evidence of the key shifts in the standards and how these key shifts guide decisions about teaching and learning in conjunction with the EngageNY resources.
- Gain clarity on how the key shifts manifest in the EngageNY curriculum when executed well in instruction.
- Investigate the impact of educators' beliefs on their interactions with students and how those beliefs can influence student success in mathematics.

Math Content Module 1
Grades K–5

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MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the curriculum
Session 1: Rigor of the Louisiana Student Standards for Mathematics (LSSM)
Grades K–5

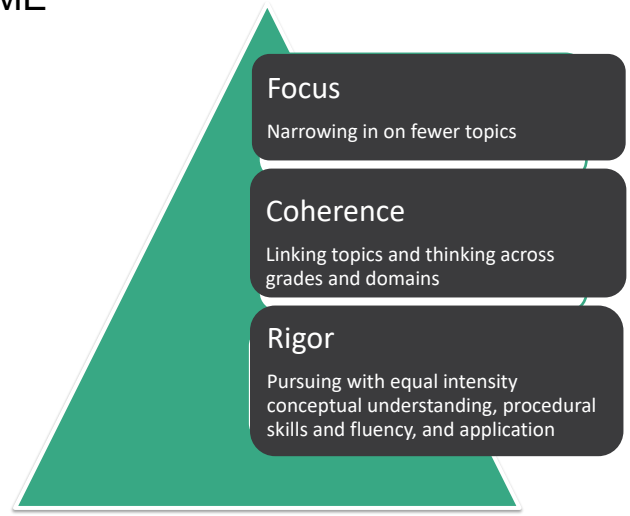
"Ultimately, college and career readiness demands students know more than just content, but demonstrate that they know how to learn and build upon that content to solve problems. They must develop versatile communication skills, work collaboratively and work competitively in a school or work environment."

— Office of the State Superintendent of Education, n.d.

6

Key shifts of the LSSM

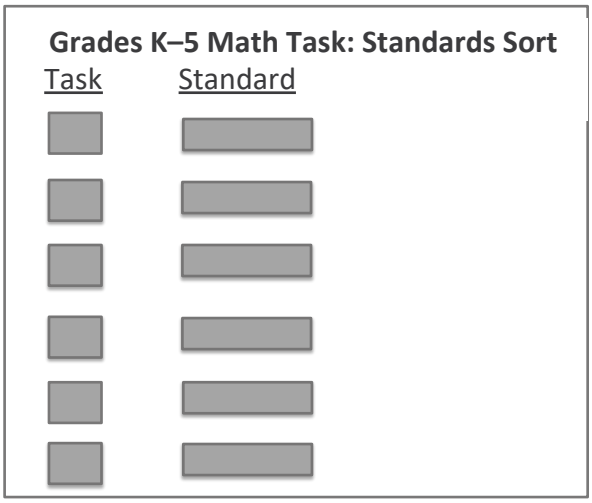
Save the last word for ME



Math Content Module 1
Grades K–5

7

Looking at the content



With your group:

- Match the task to the grade level or course standard.
- Create a poster as shown.
- Be prepared to justify your reasoning.

Math Content Module 1, Session 1
Grades K–5

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Key shifts

Rigor

Pursuing with equal intensity conceptual understanding, procedural skills and fluency, and application

Identifying the components of rigor

Grades K–5 Math Task: Standards Sort

Task	Standard	Component of Rigor
		Conceptual understanding because...
		_____ because...
		_____ because...
		_____ because...
		_____ because...

On your poster:

- Identify the component of rigor that is evident in the task.
- Justify your reasoning.
- Choose a new reporter to be prepared to share for your group.

What skills do employers value most?

What implications does this have for planning and instruction?

How do the implications connect to the key shifts of the LSSM?

Attention

- Ability to manage time and prioritize
- Follow-through

Curiosity & Commitment

- Willingness to keep learning after graduating college
- Problem solving

Grit & Agility

- Ability to overcome setbacks
- Can change direction quickly and effortlessly
- Goals-driven

Humility

- Ability to ask for help when in need and admit what they don't know
- Team-player mentality

Math Content Module 1, Session 1
Grades K–5

— Caroline Beaton. (2017 January 6). Top employers say millennials need these 4 skills in 2017. *Forbes.*

Session 1 reflection

Identify one connection between the sample EngageNY problems and the components of rigor.

What does it look like when we ask students to work on procedural skill and fluency versus conceptual understanding or application?

Math Content Module 1, Session 1
Grades K–5

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MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the curriculum
Session 2: Focus and coherence of the LSSM Grades K–5

Focus and coherence of the LSSM

The Louisiana Student Standards for Mathematics are structured around these essential instructional shifts:

Shift 1: Focus

"…focus deeply on only the concepts that are prioritized in the standards…"

Shift 2: Coherence

"…teachers carefully connect the learning within and across grades so that…students can build new understanding onto foundations built in previous years."

Math Content Module 1, Session 2
Grades K–5

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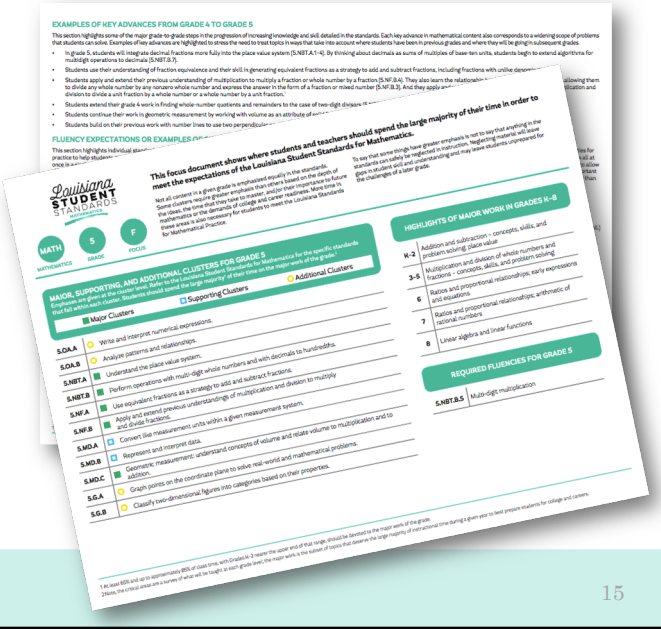
Focus on the major work of the grade

Take a few minutes to familiarize yourself with the Focus Documents.

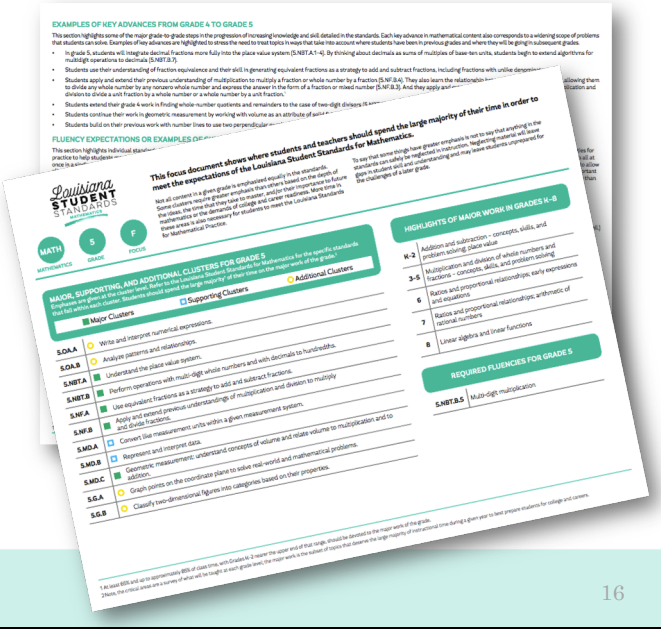
- How would you summarize the *major work* of your grade?
- Is there anything that you thought should be a part of your grade's major work that is not?
- How do the supporting and additional clusters support the major work in your grade?

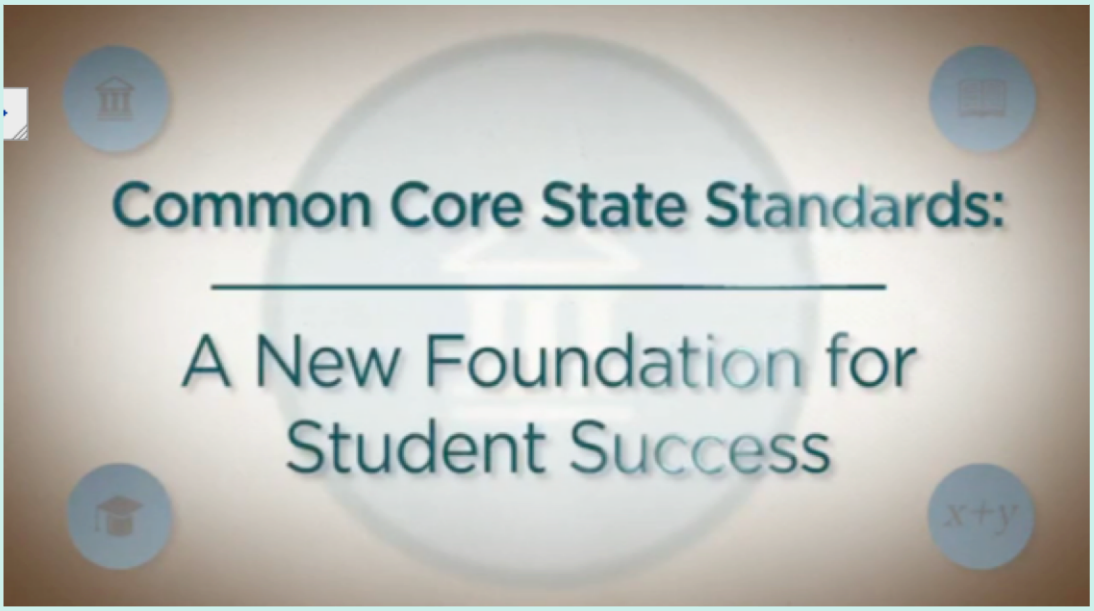


Focus on the major work of the grade

Take a few minutes to familiarize yourself with the Focus Documents.

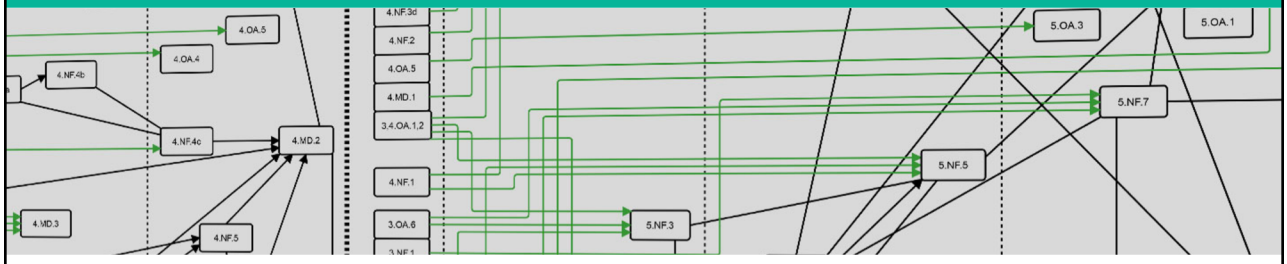
- What additional information can be found on this document, and why is it important?





Student Achievement Partners. Coherence Map: Learn more about the Coherence Map.
https://achievethecore.org/page/2801/learn-more-about-the-coherence-map

Coherence Map



- Build student understanding by linking together concepts within and across grades.
- Identify gaps in a student's knowledge by tracing a standard back through its logical prerequisites.
- Visualize and understand how supporting standards relate to the major work of the grade.

Math Content Module 1, Session 2
Grades K–5

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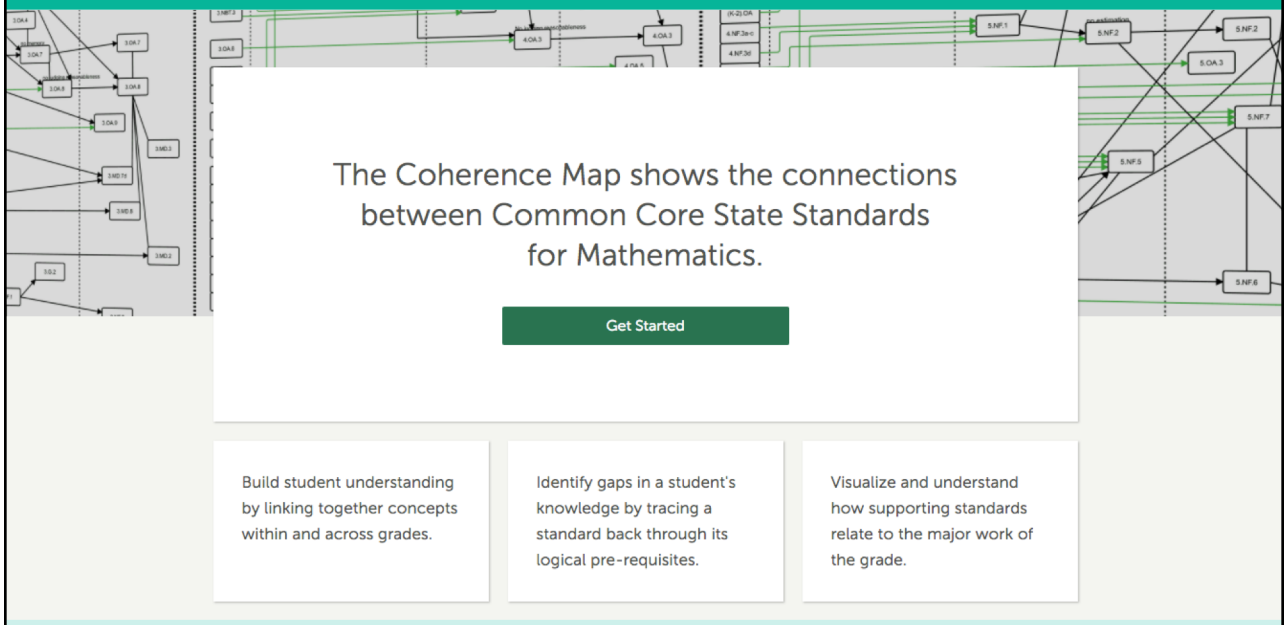
Coherence Map



https://achievethecore.org/coherence-map

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Coherence Map

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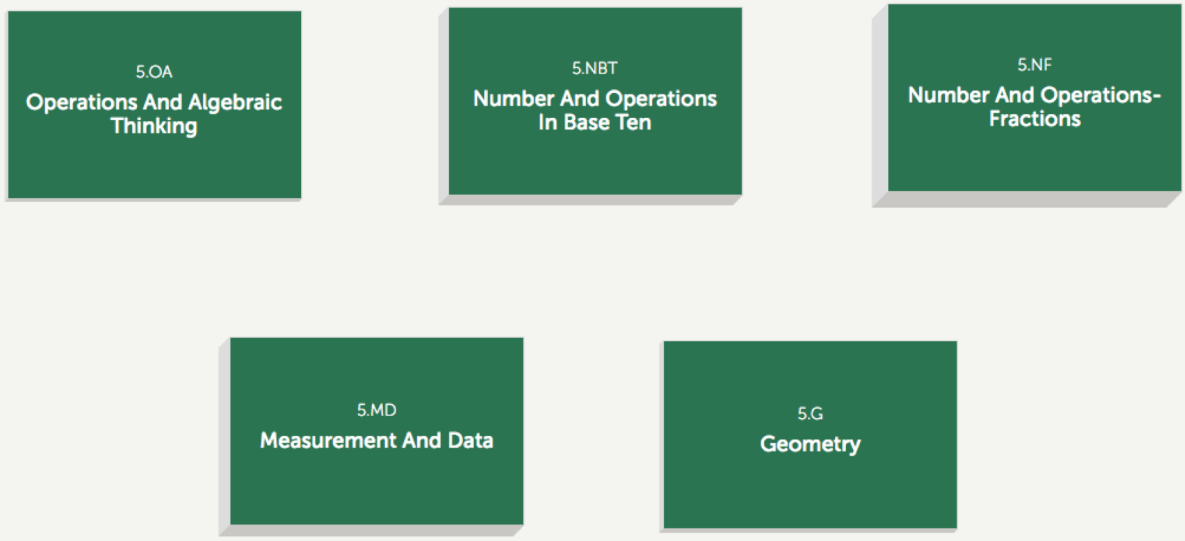
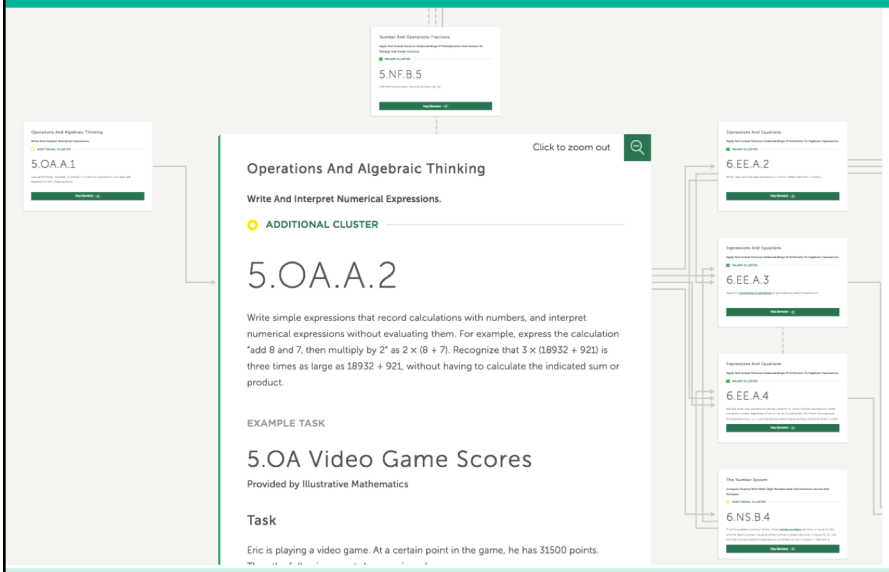
Coherence Map



Coherence Map



Arrows

An arrow (A->B) indicates related standards in situations where a student who cannot meet A is not likely to be able to meet B.

Dashed Lines

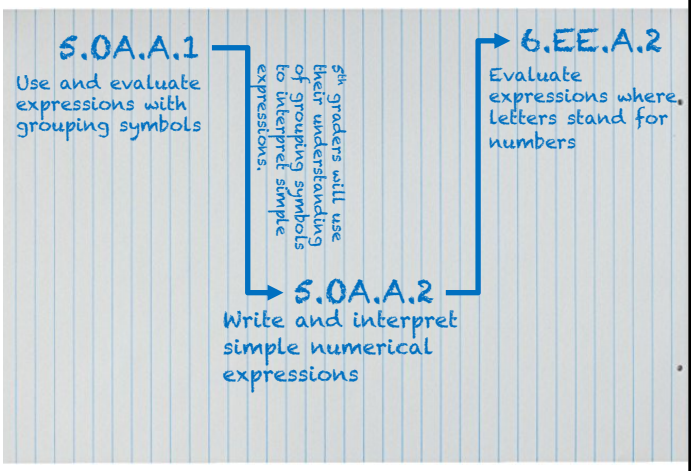
A dashed line (A---B) indicates related standards.

Coherence Map

Take a few minutes to familiarize yourself with the Coherence Map.

On your chart paper:

1. Write your grade-level standard code in the center.
2. Summarize the standard.
3. Identify at least 3 related standards and summarize them.
4. Describe how the standards are related.



Session 2 reflection

Points to ponder

- How could knowing the related standards affect teaching and learning in your classroom?
- "How might you approach teaching the standards differently knowing that they are supporting a major work, instead of being a separate, discrete topic?"

Louisiana Remediation Guides

DEPARTMENT of EDUCATION
louisiana Believes

Louisiana STUDENT STANDARDS MATHEMATICS

5th Grade Remediation Guide

Focused remediation helps target the skills students need to more quickly access and practice on-grade level content. This chart is a reference guide for teachers to help them more quickly identify the specific remedial standards necessary for every Grade 5 math standard. Students should spend the large majority of their time on the major work of the grade (■). Supporting work (■) and, where appropriate, additional work (■) can engage students in the major work of the grade.

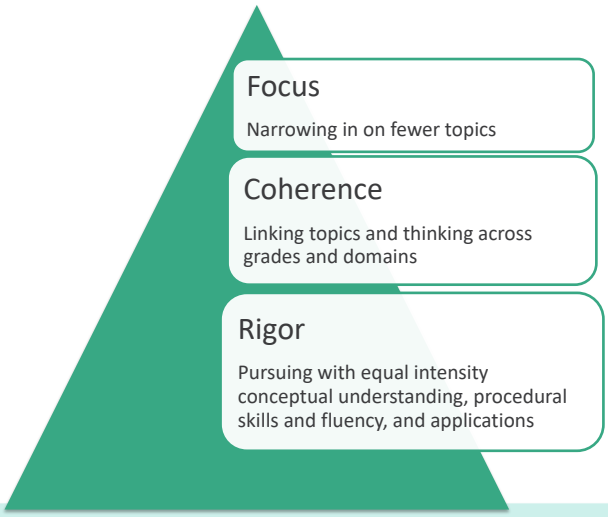
5th Grade Standard	Previous Grade(s) Standards	5th Grade Standards Taught in Advance	5th Grade Standards Taught Concurrently
5.OA.A.1 Use parentheses or brackets in numerical expressions, and evaluate expressions with these symbols.			
5.OA.A.2 Write simple expressions that record calculations with whole numbers, fractions and decimals, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18,932 + 9.21) is three times as large as 18,932 + 9.21, without having to calculate the indicated sum or product.*		5.OA.A.1 Use parentheses or brackets in numerical expressions, and evaluate expressions with these symbols.	5.NF.B.5 Interpret multiplication as scaling (resizing). a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case). c. Explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1. d. Relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

https://www.louisianabelieves.com/docs/default-source/teacher-toolbox-resources/new-standards---grade-5-remediation-guide.pdf

MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the curriculum
Session 3: Seeing the key shifts in action: Experience an EngageNY lesson
Grades K–5

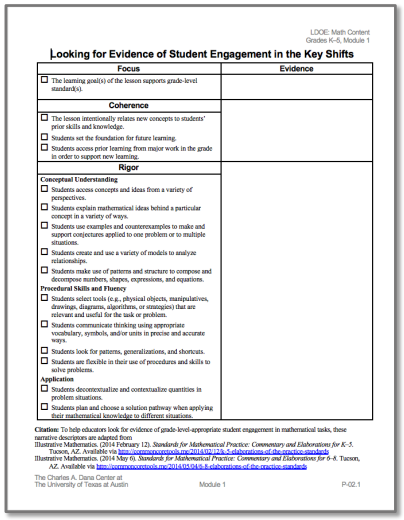
Key shifts of the LSSM



Evidence of the key shifts

Use the handout to:

- Check off student behaviors/actions that you observed.
- Record any observations you made that serve as evidence.



LDOE: Math Content
Grades K–5, Module 1

Looking for Evidence of Student Engagement in the Key Shifts

Focus	Evidence
☐ The learning goal(s) of the lesson supports grade-level standard(s).	
Coherence	
☐ The lesson intentionally relates new concepts to students' prior skills and knowledge.	
☐ Students set the foundation for future learning.	
☐ Students access prior learning from major work in the grade in order to support new learning.	
Rigor	
Conceptual Understanding	
☐ Students access concepts and ideas from a variety of perspectives.	
☐ Students explain mathematical ideas behind a particular concept in a variety of ways.	
☐ Students use examples and counterexamples to make and support conjectures applied to one problem or to multiple situations.	
☐ Students create and use a variety of models to analyze relationships.	
☐ Students make use of patterns and structure to compose and decompose numbers, shapes, expressions, and equations.	
Procedural Skills and Fluency	
☐ Students select tools (e.g., physical objects, manipulatives, drawings, diagrams, algorithms, or strategies) that are relevant and useful for the task or problem.	
☐ Students communicate thinking using appropriate vocabulary, symbols, and/or units in precise and accurate ways.	
☐ Students look for patterns, generalizations, and shortcuts.	
☐ Students are flexible in their use of procedures and skills to solve problems.	
Application	
☐ Students decontextualize and contextualize quantities in problem situations.	
☐ Students plan and choose a solution pathway when applying their mathematical knowledge to different situations.	

Citation: To help educators look for evidence of grade-level-appropriate student engagement in mathematical tasks, these narrative descriptors are adapted from
Illustrative Mathematics. (2014 February 12). *Standards for Mathematical Practice: Commentary and Elaborations for K–5*. Tucson, AZ. Available via http://commoncoretools.me/2014/02/12/k-5-elaborations-of-the-practice-standards
Illustrative Mathematics. (2014 May 6). *Standards for Mathematical Practice: Commentary and Elaborations for 6–8*. Tucson, AZ. Available via http://commoncoretools.me/2014/05/04/6-8-elaborations-of-the-practice-standards

The Charles A. Dana Center at
The University of Texas at Austin Module 1 P-02.1

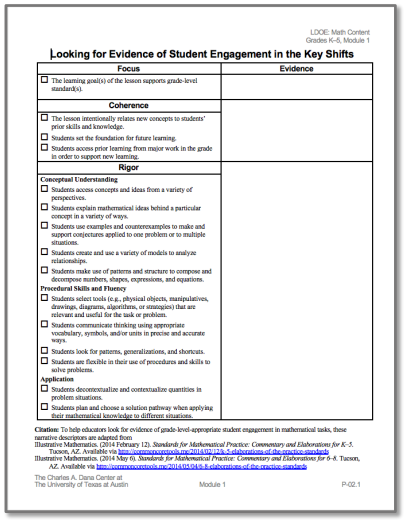
Looking for evidence of the *key shifts* in the mathematics classroom

Mark had a stick of 9 green linking cubes. His friend gave him 4 yellow linking cubes. How many linking cubes does Mark have now?

Evidence of the key shifts

Use the handout to:

- Check off student behaviors/actions that you observed.
- Record any observations you made that serve as evidence.



LDOE: Math Content
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Illustrative Mathematics. (2014 May 6). *Standards for Mathematical Practice: Commentary and Elaborations for 6–8*. Tucson, AZ. Available via http://commoncoretools.me/2014/05/04/6-8-elaborations-of-the-practice-standards

The Charles A. Dana Center at
The University of Texas at Austin Module 1 P-02.1

Session 3 reflection

Four Corners

Corner A: Coherence	Corner C: Conceptual Understanding
Evidence of the Key Shifts	
Corner B: Procedural Skills and Fluency	Corner D: Application

Math Content Module 1, Session 3
Grades K–5

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MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the Tier 1 curriculum
Session 4: Exploring the EngageNY curriculum
Grades K–5

What is alignment?

Alignment is more than…

- A chart
- A textbook correlation
- A scope and sequence
- A curriculum guide
- A testing plan

These things imply alignment, but they do not achieve alignment.

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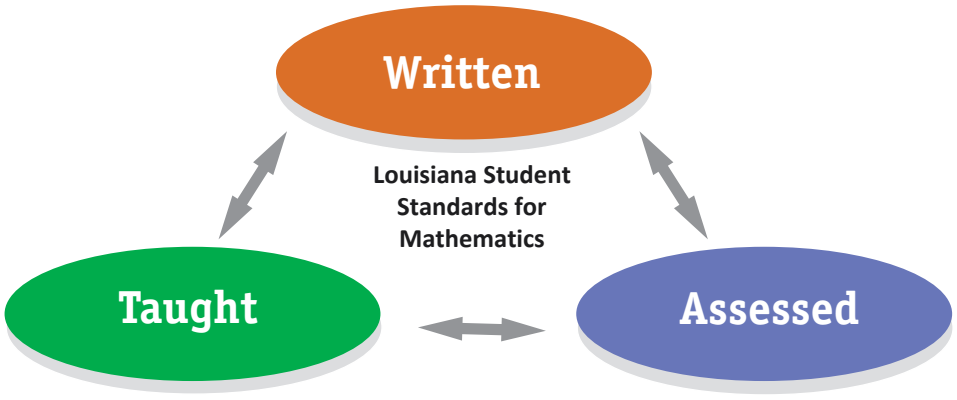
What is alignment?



Adapted from the work of Fenwick English

Math Content Module 1, Session 4
Grades K–5

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What is alignment?

Alignment means ***EVERY*** educator…

- Understands what is expected of students.
- Understands these expectations within the context of the K–12 program.
- Accepts responsibility for meeting these expectations.

Math Content Module 1, Session 4
Grades K–5

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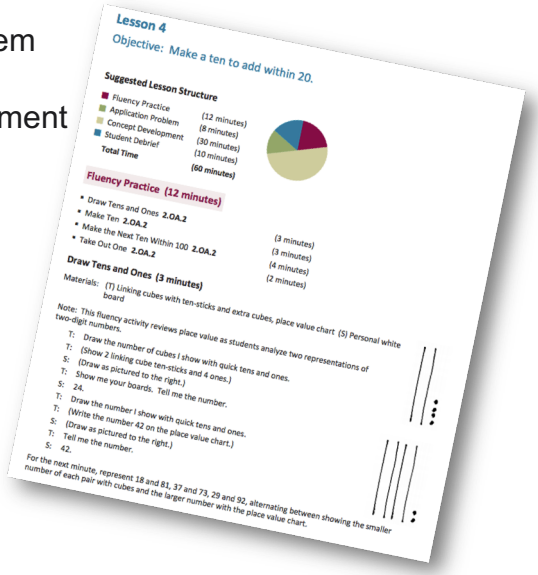
What are the main components of the EngageNY curriculum resource?

What is the purpose of each component?

- Fluency Practice
- Application Problem
- Concept Development
- Problem Set
- Student Debrief
- Exit Ticket
- Homework



Lesson 4

Objective: Make a ten to add within 20.

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(8 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Fluency Practice (12 minutes)

- Draw Tens and Ones **2.OA.2** (3 minutes)
- Make Ten **2.OA.2** (3 minutes)
- Make the Next Ten Within 100 **2.OA.2** (4 minutes)
- Take Out One **2.OA.2** (2 minutes)

Draw Tens and Ones (3 minutes)

Materials: (T) Linking cubes with ten-sticks and extra cubes, place value chart (S) Personal white board

Note: This fluency activity reviews place value as students analyze two representations of two-digit numbers.

T: Draw the number of cubes I show with quick tens and ones.
T: (Show 2 linking cube ten-sticks and 4 ones.)
S: (Draw as pictured to the right.)
T: Show me your boards. Tell me the number.
S: 24.
T: Draw the number I show with quick tens and ones.
T: (Write the number 42 on the place value chart.)
S: (Draw as pictured to the right.)
T: Tell me the number.
S: 42.

For the next minute, represent 18 and 81, 37 and 73, 29 and 92, alternating between showing the smaller number of each pair with cubes and the larger number with the place value chart.

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Unpacking the EngageNY lesson

2.OA.B.2

Fluently add and subtract within 20 using mental strategies.[2] By the end of Grade 2, know from memory all sums of two one-digit numbers.

[2] See standard 1.OA.6 for a list of mental strategies.

Mental Strategies: counting on;
making ten;
decomposing a number leading to a ten;
using the relationship between addition and subtraction;
creating equivalent but easier or known sums

Math Content Module 1, Session 4
Grades K–5

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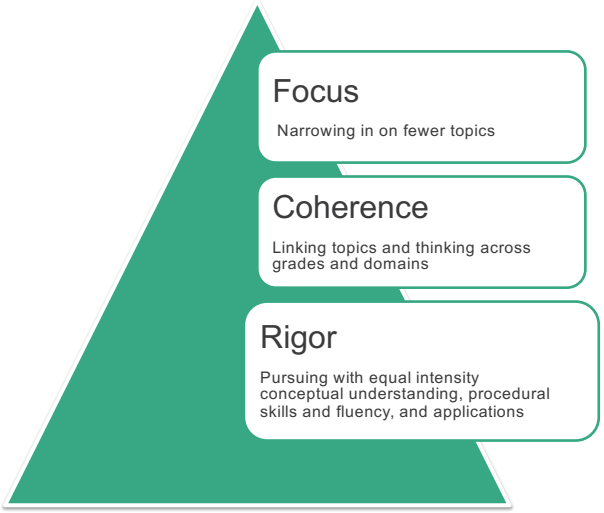
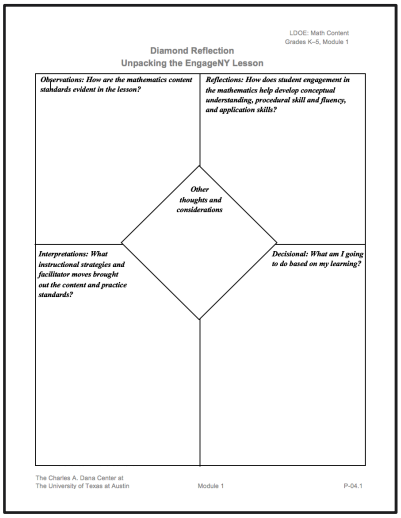
Evidence of the key shifts





Math Content Module 1, Session 4
Grades K–5

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Session 4 reflection

Personal reflection

- How will unpacking EngageNY lessons for the standards and key shifts affect your planning and instruction?
- As a result of your learning in Sessions 3 and 4, identify one *action* you will take to effectively plan for instruction.

Math Content Module 1, Session 4
Grades K–5

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MATHEMATICS CONTENT MODULES

Module 1: Setting the foundation for implementing the curriculum
Session 5: Classroom culture
Grades K–5

"When students realize they can succeed in mathematics, they are transformed—you can see them raise their aspirations for school and for life."

—Uri Treisman

University Distinguished Teaching Professor,
Professor of Mathematics, Professor of Public Affairs, and
Executive Director, the Charles A. Dana Center at
The University of Texas at Austin

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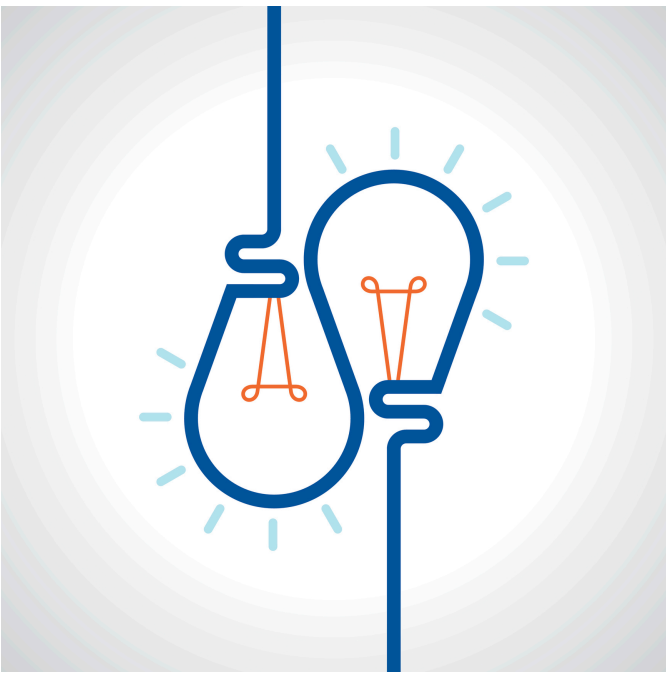
Quiz

Give yourself 4 points each time you answered AGREE on the gray squares.

Subtract 2 points for each time you answered AGREE on the white squares.



Credit: ARTQU / iStock / Thinkstock

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Fixed versus *malleable* intelligence

Read Carol Dweck's article, "The Perils and Promises of Praise," and consider the following:

What in this research confirms your current knowledge and beliefs?

What questions does this research raise for you?

http://www.ascd.org/publications/educational-leadership/oct07/vol65/num02/The-Perils-and-Promises-of-Praise.aspx

Math Content Module 1, Session 5
Grades K–5

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Fixed versus *malleable* intelligence

Consequences for students who view intelligence as **fixed**	Consequences for students who view intelligence as **malleable**

Math Content Module 1, Session 5
Grades K–5

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Supporting a growth mindset

- Provide opportunities for collaboration and discourse.
- Encourage high, equitable levels of student participation.
- Encourage a broad range of competencies and approaches.
- Promote cooperative learning and shared accountability.
- Provide autonomy and choice in tasks, teams, and processes.
- Model and monitor the climate for interactions among students.

What are the implications?

Based on your reading and discussion:

- How might this research inform the ways in which you interact with and teach your students?
- How might this research impact the culture of learning in your classroom?

"The Louisiana Student Standards for Mathematics are like _____ because…"

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What to expect in Modules 2–6

- **Key Shifts in Action** through an EngageNY lesson
- **Exploring Coherence** in the LSSM
- **Deepening Mathematical Content Knowledge** for effective instruction
- **Instructional Strategies** for improving the implementation of the curriculum
- **Purposeful Planning** of the EngageNY curriculum
- The role of a **Productive Classroom Culture** in the EngageNY curriculum

Math Content Module 1
Grades K–5

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References

The Louisiana Department of Education provides many key resources via this web page — K-12 Math Planning Resources: https://www.louisianabelieves.com/resources/library/k-12-math-year-long-planning — including: *K–12 Louisiana Student Standards for Mathematics (LSSM) | Teachers Companion Documents | Implement The Eureka Curriculum: Louisiana Eureka Guides | Help Students Who Struggle: Remediation Guides. For example,* https://www.louisianabelieves.com/docs/default-source/teacher-toolbox-resources/new-standards---grade-5-remediation-guide.pdf *The Louisiana Student Standards for Mathematics: A Guide to Rigor in Mathematics 2.0*, at https://www.louisianabelieves.com/docs/default-source/year-long-planning/k-12-lssm-alignment-to-rigor.pdf This document (name in link: "K-12 LSSM Alignment to Rigor") as well as the individual rigor documents for each grade level —e.g., "Kindergarten LSSM Alignment to Rigor," "Grade 1 LSSM Alignment to Rigor," and so on) can be downloaded via this web page: https://www.louisianabelieves.com/resources/library/k-12-math-year-long-planning

EngageNY curriculum, open educational resources (OER) from the New York State Department of Education. Various curriculum resources, available via https://www.engageny.org. Including:

Pre-Kindergarten-Grade 5 Mathematics: Curriculum Map and Guiding Documents. EngageNY. Available via https://www.engageny.org/resource/pre-kindergarten-grade-5-mathematics-curriculum-map-and-guiding-documents

(2013 July 4). How to Implement A Story of Units. Available at https://www.engageny.org/sites/default/files/resource/attachments/how_to_implement_a_story_of_units.pdf

(2014). Lesson: "Grade 5 Mathematics Module 4, Topic E, Lesson 13: Objective: Multiply unit fractions by unit fractions." Available via https://www.engageny.org/resource/grade-5-mathematics-module-4-topic-e-lesson-13 | The EngageNY curriculum resources are shared under the EngageNY terms of use (https://www.engageny.org/terms-of-use) and the Creative Commons license—Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0)—mentioned therein: https://creativecommons.org/licenses/by-nc-sa/3.0

Illustrative Mathematics. (2014 February 12). *Standards for Mathematical Practice: Commentary and Elaborations for K–5.* Tucson, AZ. Available via http://commoncoretools.me/2014/02/12/k-5-elaborations-of-the-practice-standards

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Module evaluation

Your feedback and comments are important to us. Please complete the module evaluation found at:

http://www.utdanacenter.org/ldoe/surveys