Louisiana Believes

Observations to Support Mathematics Instruction

DEPARTMENT of EDUCATION

Objectives

By the end of the session, participants will be able to:

- Understand 2014-2015 focus areas for mathematics classrooms and identify how they are supported by the Compass Rubric.
- Understand how student actions and teacher actions should change to support the focus areas.
- Identify the tools available to support observation and feedback and understand their appropriate use.

Agenda

- **What are the focus areas for mathematics in 2014-2015?**

How does the Compass rubric help educators implement the necessary shifts in teacher practice?

- What do we expect to see students doing as a result?
- When we observe, what shift in teacher practice do we expect to see?

What resources are available?

What are our next steps?

Student Focus Areas 2014-15

What should students be doing in math classrooms?

Mathematics

- Master priority concepts and practice standards (not just procedures)
- Master targeted remedial content that allows faster on grade level practice

What should teachers be doing differently?

Math teachers plan, instruct and assess using:

- Tasks that build conceptual understanding of priority standards
- Tasks that require fluency and use of math practices to master concepts
- Just enough remediation to help students practice on grade level content as quickly as possible

Math: Connecting Student & Teacher Actions

If we want students to do this in ELA/Math:	Then educators should plan, instruct, & assess using:
Master priority concepts and practice standards (not just procedures)	• Tasks that build conceptual understanding of priority standards • Tasks that require fluency and use of math practices to master concepts • Just enough remediation to help students practice on level content as quickly as possible
Master targeted remedial content that allows faster on grade level practice	

Observing these Shifts

1c. Setting instructional outcomes

2c. Managing classroom procedures

3b. Using questioning/prompts and discussion

3c. Engaging student in learning

3d. Using assessment in instruction

Student Focus 2014-15

Mathematics

Master priority concepts and practice standards (not just procedures).

Master targeted remedial content that allows faster on grade level practice

Priority Content

- How do I know what content to prioritize?
- Where do I find the priority content?

Priority Content: K - 2

Grade	Content Focus
K	1. Representing and comparing whole numbers, initially with sets of objects 2. Describing shapes and space
1	1. Developing understanding of addition, subtraction, and strategies for addition and subtraction within 20 2. Developing understanding of whole number relationships and place value, including grouping in tens and ones 3. Developing understanding of linear measurement and measuring lengths as iterating length units 4. Reasoning about attributes of, and composing and decomposing geometric shapes
2	1. Extending understanding of base-ten notation 2. Building fluency with addition and subtraction 3. Using standard units of measure 4. Describing and analyzing shapes

Priority Content: 3 – 5

Grade	Content Focus
3	1. Developing understanding of multiplication and division and strategies for multiplication and division within 100 2. Developing understanding of fractions, especially unit fractions (fractions with numerator 3. Developing understanding of the structure of rectangular arrays and of area describing and analyzing two-dimensional shapes
4	1. Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends 2. Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers 3. 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
5	1. Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions) 2. Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

Priority Content: 6 – 8

Grade	Content Focus
6	1. Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems 2. Completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers 3. Writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking
7	1. Developing understanding of and applying proportional relationships 2. Developing understanding of operations with rational numbers and working with expressions and linear equations 3. Solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples
8	1. Formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations 2. Grasping the concept of a function and using functions to describe quantitative relationships 3. Analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Priority Content: High School

Grade	Content Focus
Algebra I	1. Analytic geometry of lines; adding, subtracting, and multiplying polynomials 2. Transforming expressions and chunking (seeing parts of an expression as a single object)
Geometry	1. Transformational geometry; proofs 2. Triangle congruence and similarity criteria 3. Coordinate geometry (for use in proofs) 4. Geometric constructions 5. Modeling with geometric concepts
Algebra II	1. Complex numbers 2. Rational expressions 3. Equations, and functions 4. Sequences and series (recursive and explicit formulas)

Priority Content – Grade Level Fluencies

Grade	Required Fluency by Grade
K	Add and subtract within 5
1	Add and subtract within 10
2	Add and subtract within 20 ; Add and subtract within 100 (paper and pencil)
3	Multiply / divide within 100; Add/subtract within 1,000
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 2x2 systems by inspection

Focus: Priority Content

Activity

THINK – PAIR – SHARE

How will teachers know what to prioritize?

How is this teacher action observed?

Observation - Priority Content

	Ineffective	Effective: Emerging	Effective: Proficient	Highly Effective
1c: Setting Instructional Outcomes	Outcomes represent low expectations for students and lack of rigor, nor do they all reflect important learning in the discipline. Outcomes are stated as activities, rather than as student lear… Outcomes reflect o… type of learning and… discipline or strand, … suitable for only so… dents.	Outcomes represent moderately high expectations and rigor. Some reflect important learning in the discipline, and consist of a combination of outcomes and activities. Out-	Most outcomes represent rigorous and important learning in the discipline. All the instructional outcomes are clear, written in the form of student learning … gest viable met… sessment. Outc… several different… learning and op… for coordination… take into accoun… needs of groups of students.	All outcomes represent rigorous and important learning in the discipline. The outcomes are clear, written in the form of student learning, … …es …on take into a… …e varying needs of ind… …l students.
Critical Attributes	• Outcomes lack rigor. • Outcomes do not represent important learning in the discipline. • Outcomes are not clear or are stated as activities. • Outcomes are not suitable for many students in the class.	• Outcomes repre… mixture of low expe… …ns and rigor. • Some outcomes reflect important learning in the discipline. • Outcomes are suitable for most of the class.	• Outcomes represent high expectations and rigor. • Outcomes are related to "big ideas" of the discipline. • Outcomes are written in terms of what students will learn rather than do. • Outcomes represent a range of outcomes: factual, conceptual understanding, reasoning, social, management, communication. • Outcomes are suitable to groups of students in the class, differentiated where necessary.	In addition to … characteristics of "proficient," … • Teacher plans reference curricular frameworks or blueprints to ensure accurate sequencing. • Teacher connects outcomes to previous and future learning • Outcomes are differentiated to encourage individual students to take educational risks.

Teacher Focus

Teacher Focus

Teacher Focus

Student Focus 2014-15

Mathematics

Master priority concepts and practice standards (not just procedures)

Master targeted remedial content that allows faster on grade level practice

Mastery of Remedial Content

What does “just enough” remediation look like in terms of student actions?

Activity

- ✓ Read pages 11-12 from the Math Guidebook. Discuss with a partner:
- ✓ How is this a change in practice?
- ✓ What teacher/student actions are described?

Agenda

What are the focus areas for mathematics in 2014-2015?

How does the Compass rubric help educators implement the necessary shifts in teacher practice?

- **What do we expect to see students doing as a result?**
- **When we observe, what shift in teacher practice do we expect to see?**

What resources are available?

What are our next steps?

What should students be doing?

CCSS MATH PRACTICES

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

What should teachers be doing?

Math teachers plan, instruct and assess using:

- **Tasks that build conceptual understanding of priority standards**
- Tasks that require fluency and use of math practices to master concepts
- Just enough remediation to help students practice on grade level content as quickly as possible

Observation - Building Conceptual Understanding

	Ineffective	Effective: Emerging	Effective: Proficient	Highly Effective
1c: Setting Instructional Outcomes	Outcomes represent low expectations for students and lack of rigor, nor do they all reflect important learning in the discipline. Outcomes are stated as activities, rather than as student learning. Outcomes reflect only one type of learning and only one discipline or strand, and are suitable for only some students.	Outcomes represent moderately high expectations and rigor. Some reflect important learning in the discipline, and consist of a combination of outcomes and activities. Outcomes reflect several types of learning, but teacher has made no attempt at coordination or integration. Most of the outcomes are suitable for most of the students in the class based on global assessments of student learning.	Most outcomes represent rigorous and important learning in the discipline. All the instructional outcomes are clear, written in the form of student learning, and suggest viable methods of assessment. Outcomes reflect several different types of learning and opportunities for coordination. Outcomes take into account the varying needs of groups of students.	All outcomes represent rigorous and important learning in the discipline. The outcomes are clear, written in the form of student learning, and permit viable methods of assessment. Outcomes reflect several different types of learning and, where appropriate, represent opportunities for both coordination and integration. Outcomes take into account the varying needs of individual students.
Critical Attributes	• Outcomes lack rigo • Outcomes do not r… important learning… discipline. • Outcomes are not … are stated as activi… • Outcomes are not suitable for many students in the class.	• Outcomes are … for most of the class.	• Outcomes represent high expectations and rigor. • Outcomes are related to "big ideas" of the discipline. • Outcomes are written in terms of what students will learn rather than do. • Outcomes represent a range of outcomes: factual, conceptual understanding, reasoning, social, management, communication. • Outcomes are suitable to	In addition to the characteristics of "proficient," • Teacher plans reference curricular frameworks or blueprints to ensure accurate sequencing. • Teacher connects outcomes to previous and future learning • Outcomes are differentiated to encourage individual students to take educational risks.

Teacher Focus

Observation – Building Conceptual Understanding

	Ineffective	Effective: Emerging	Effective: Proficient	Highly Effective
3b: Using questioning/ prompts and discussion	Teacher's questions are of low cognitive challenge, single correct responses, and asked in rapid succession. Interaction between teacher and students is predominantly recitation style, with the teacher media… questions and ans… students dominate… cussion.	Teacher's questions lead students through a single path of inquiry, with answers seemingly determined in advance. Alternatively the teacher attempts to frame some questions designed to … and to encou… to respond to one a… with uneven results.	While the teacher may use some low-level questions, he or she poses questions to students designed to promote student thinking and understanding. Teacher creates a genuine discussion among students, providing adequate time for stud… to respond, and steppi… aside when appropria… Teacher successfully e… most students in the c… sion, employing a rang… strategies to ensure that most students are heard.	Teacher uses a variety or series of questions or prompts to challenge students cognitively, advance high level thinking and discourse, and promote meta-cognition. Students formulate many questions, initiate topics and …
Critical Attributes	• Questions are rapid-fire, and convergent, with a single correct answer. • Questions do not… dent thinking. • All discussion is b… teacher and stude… dents are not invited to speak directly to one another. • A few students dominate the discussion.	• Teacher frames some questions designed to promote … few studen… d. • Teacher calls on … students, but only a s… ll number actually participate in the discussion.	• Teacher uses open-ended questions, inviting students to think and/or have multiple possible answers. • The teacher makes effective use of wait time. • The teacher builds on uses student responses to questions effectively. • Discussions enable students to talk to one another, without ongoing mediation by the teacher.	In addition to the c… racteristics of "proficient," • Students initiate higher-order questions. • Students extend the discussion, enriching it. • Students invite comments from their classmates during a discussion

Teacher Focus

Teacher Focus

Student Focus

Teacher & Student Actions – Building Conceptual Understanding

What does it look like for students to engage in math practices?

Activity

- ✓ **Watch the video** from the LDOE Video Library.
- ✓ Collect evidence of **student** and **teacher actions** throughout.
- ✓ Note evidence of **students** engaging in **math practices**.

What should teachers be doing?

Plan, instruct and assess using:

- Tasks that build conceptual understanding of priority standards
- **Tasks that require fluency and use of math practices to master concepts**
- Just enough remediation to help students practice on grade level content as quickly as possible

Teacher Actions - Use of Math Practices

What teacher actions support this shift?

Circulate and choose two students' work, one which completes the ten and one which does not but does show the associative and commutative properties.

MP.3

S: 12 + 8 and 18 + 2. → 12 + 4 = 16 and 14 + 12 = 26.

T: (Recording on board.) Excellent choices.

S: But the second doesn't use a basic fact that equals ten!

T: Charles, can you defend your response?

C: I think it is the same because both problems show the switch around in the ones place.

S: Yeah, both pairs use one basic fact.

S: The teacher didn't say exactly what had to be the same. Charles just left out the *make ten*.

T: Is he wrong or right? Discuss it with your partner.

Observation – Fluency & Math Practices

Component	3c: Engaging Students in Learning			
	Ineffective	**Effective: Emerging**	**Effective: Proficient**	**Highly Effective**
Critical Attributes	• Few students are intellectually engaged in the lesson. • Learning tasks require only recall or have a single correct response or method. • The materials used ask students only to perform rote tasks. • Only one type of instructional group is used (whole group, small groups) when variety would better serve the instructional purpose. • Instructional materials used are unsuitable to the lesson and/or the • The lesso	• Some students are intellectually engaged in the lesson. • Learning tasks are a mix of those requiring thinking and recall. • Student engagement with the content is largely passive, learning primarily facts or procedures. • Students have no choice in how they complete tasks. • The teacher uses different instructional groupings; these are partially success- son ourc- d to ng • The pacing of the lesson is uneven; suitable in parts, but rushed or dragging in others.	• Most students are intellectually engaged in the lesson. • Learning tasks have multiple correct responses or approaches and/or demand higher order thinking. • Students have some choice in how they complete learning tasks. • There is a mix of different types of groupings, suitable to the lesson objectives. • Materials and resources support the learning goals and require intellectual engagement, as appropriate. • The pacing of the lesson provides students the time needed to be intellectually engaged.	In addition to the characteristics of "proficient," • Virtually all students are highly engaged in the lesson. • Students take initiative to modify a learning task to make it more meaningful or relevant to their needs. • Students suggest modifications to the grouping patterns used. • Students have extensive choice in how they complete tasks. • Students suggest modifications or additions to the materials being used. • Students have an opportunity for reflection and closure on the lesson to consolidate their understanding.

Teacher Focus

Student Focus

Student Actions –Math Practices

What teacher actions support reflect this shift?

Activity

- ✓ **Watch the video** from the LDOE Video Library.
- ✓ Collect evidence of **teacher** and **student actions** throughout.
- ✓ Note evidence of the **teacher actions** that build **conceptual understanding**.

What should teachers be doing?

Plan, instruct and assess using:

- Tasks that build conceptual understanding of priority standards
- Tasks that require fluency and use of math practices to master concepts
- **Just enough remediation to help students practice on grade level content as quickly as possible**

Observing – Mastery of Remedial Content

Component	3d: Using Assessment in Instruction			
	Ineffective	**Effective: Emerging**	**Effective: Proficient**	**Highly Effective**
Critical Attributes	• The teacher gives no indication of what high… looks like. • The teacher mak… to determine whe… dents understand… • Feedback is only global. • The teacher does not ask students to evaluate their own or classmates' work.	• There is little evidence that … method, o… …eliciting evidence of u… …ding from all students. • Teacher requests global i… dications of student understanding. • Feedback to students is not uniformly specific, not oriented towards future improvement of work. • The teacher makes only …age …er… …s to adjust the lesson are partially successful.	• Students indicate that they clearly understand the characteristics of high quality work. • The teacher elicits evidence of student understanding during the lesson Students are invited to assess their own work and make improvements. • Feedback includes specific and timely guidance for at least groups of students. • The teacher attempts to engage students in self- or peer-assessment. • When necessary, the teacher makes adjustments to the lesson to enhance understanding by groups of students.	• Teacher monitoring student understanding is sophisticated and continuous: the teacher is constantly "taking the pulse" of the class. • Teacher makes frequent use of strategies to elicit information about individual student understanding. • Feedback to students is specific and timely, and is provided from many sources, including other students. • Students monitor their own understanding, either on their own initiative or as a result of tasks set by the teacher. • The teacher's adjustments to the lesson are designed to assist individual students.

Teacher Focus

Teacher & Student Focus

Teacher Focus

Teacher Focus

Teacher Actions - Providing Remediation

What teacher actions reflect this shift?

Activity

THINK – PAIR – SHARE

1) In the area/perimeter video (slide 23) what evidence of this type of remediation did you see?

2) What student actions did you see?

Agenda

What are the focus areas for mathematics in 2014-2015?

How does the Compass rubric help educators implement the necessary shifts in teacher practice?

- What do we expect to see students doing as a result?
- When we observe, what shift in teacher practice do we expect to see?

What resources are available?

What are our next steps?

Aligned Resources

Teacher Actions	Compass Rubric Alignment	Teacher Resources
Priority Content	**1c.**	Common Core State Standards Assessment Guides Module 2: Focus and Coherence – The First Two CCSSM Shifts PARCC Model Content Frameworks
Conceptual Understanding	**1c., 3b.**	Module 3: Rigor – The Third CCSSM Shift K-12 Math Tasks
Fluency	**3c.**	Module 3: Rigor – The Third CCSSM Shift
Math Practices	**3c.**	Standard for Mathematical Practice Teacher Toolbox
Remediation	**3d.**	Math Guidebooks K-12 Math Remediation Recommendations
Other Resources		**Video Library** **School Achievement Partners**

Agenda

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- What do we expect to see students doing as a result?
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Next Steps

Making a Plan

- ✓ Identify key teacher actions you should be able to observe in mathematics classes in 2014-2015.
- ✓ What actions should we observe in math classrooms in 2014-2015?
- ✓ How does the Compass rubric support these shifts?
- ✓ How can you use the observation and feedback cycle to help teachers make these shifts?

Questions?

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http://www.louisianabelieves.com/teaching/compass