Teacher Training
Revised ELA and Math Standards

Math 3–5

Tennessee Department of Education | 2017 Summer Teacher Training

TN Department of Education

Welcome, Teachers!

We are excited to welcome you to this summer's teacher training on the revised math standards. We appreciate your dedication to the students in your classroom and your growth as an educator. As you interact with the math standards over the next two days, we hope you are able to find ways to connect this new content to your own classroom. Teachers perform outstanding work every school year, and our hope is that the knowledge you gain this week will enhance the high-quality instruction you provide Tennessee's children every day.

We are honored that the content of this training was developed by and with Tennessee educators *for* Tennessee educators. We believe it is important for professional development to be informed by current educators, who work every day to cultivate every student's potential.

We'd like to thank the following educators for their contribution to the creation and review of this content:

Dr. Holly Anthony, Tennessee Technological University
Michael Bradburn, Alcoa City Schools
Dr. Jo Ann Cady, University of Tennessee
Sherry Cockerham, Johnson City Schools
Dr. Allison Clark, Arlington Community Schools
Kimberly Herring, Cumberland County Schools
Dr. Joseph Jones, Cheatham County Schools
Dr. Emily Medlock, Lipscomb University

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Part 1: The Standards

Module 1: Standards Review Process

Module 2: Tennessee Academic Standards

Module 3: Summary of Revisions

Part 2: Developing a Deeper Understanding

Module 4: Diving into the Standards (KUD)

Part 3: Instructional Shifts

Module 5: Revisiting the Shifts and SMP's

Module 6: Literacy Skills for Mathematical Proficiency

Part 4: Assessment and Materials

Module 7: Connecting Standards and Assessment

Module 8: Evaluating Instructional Materials

Part 5: Putting it All Together

Module 9: Instructional Planning

Notes

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Agenda: Day 1

Time	Content
8–11:15 (includes break)	**Part 1: The Standards** • M1: Standards Review Process • M2: TN Academic Standards • M3: Summary of Revisions
11:15–12:30	**Lunch (on your own)**
12:30–4 (includes break)	**Part 2: Developing a Deeper Understanding** • M4: Diving into the Standards (KUD) **Part 3: Instructional Shifts** • M5: Revisiting the Shifts and SMP's • M6: Literacy Skills for Mathematical Proficiency

Goals: Day 1

- Review the standards revision process.
- Highlight changes/revisions to standards.
- Use a KUD exercise to deepen our understanding of the expectations of the standards.
- Discuss the instructional shifts and the Standards for Mathematical Practice (SMPs).
- Explore the Literacy Skills for Mathematical Proficiency.

Agenda: Day 2

Time	Content
8–11:15 (includes break)	**Part 4: Aligned Materials and Assessments** • M7: Assessing Student Understanding
11:15–12:30	**Lunch (on your own)**
12:30–4 (includes break)	• M8: Evaluating Instructional Materials **Part 5: Putting it All Together** • M9: Instructional Planning

Goals: Day 2

- Examine best practices for assessing student learning.
- Develop a process for evaluating instructional materials.
- Connect standards and assessment through instructional planning.

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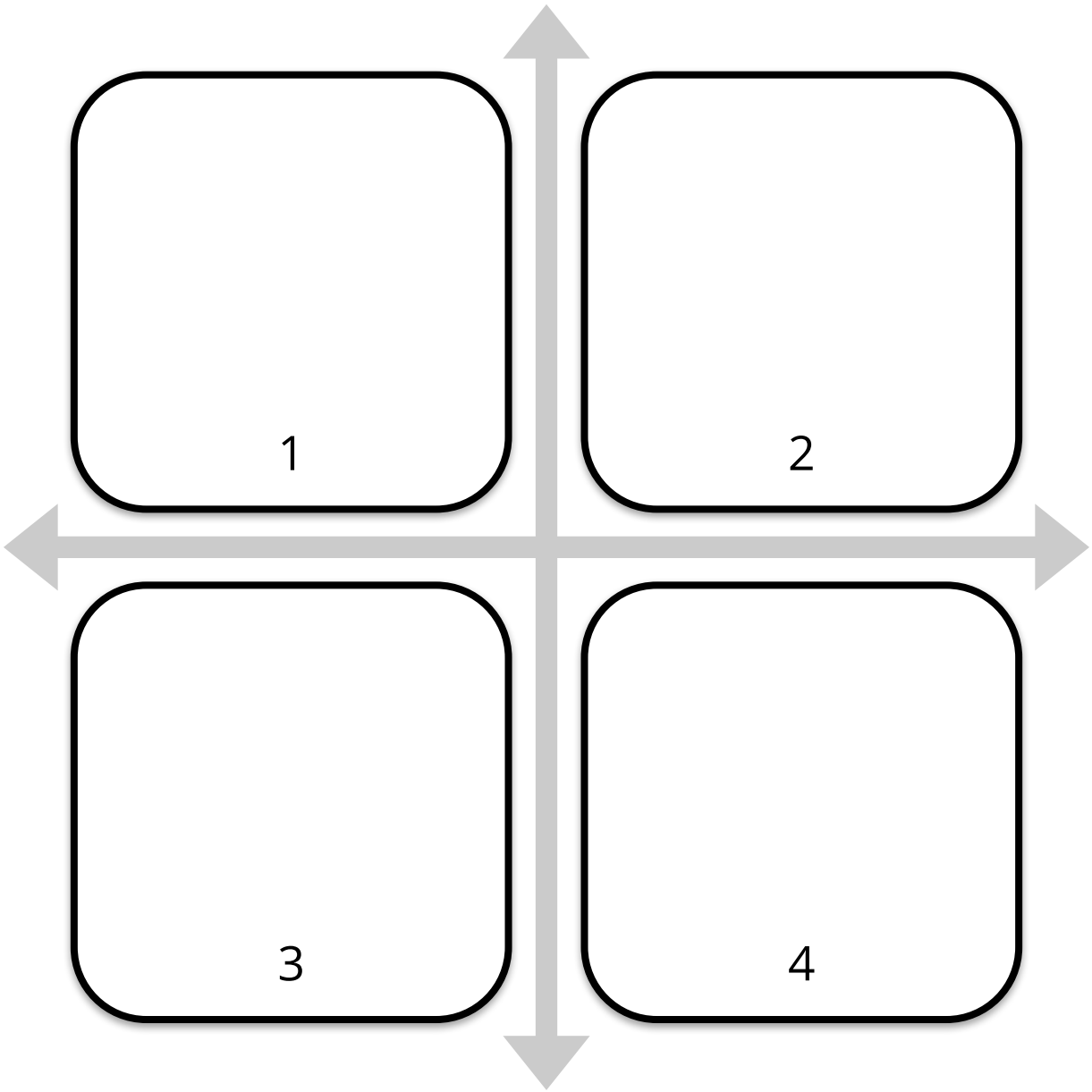
Appointment Time

Make four appointments to meet with fellow participants throughout the training to discuss the content. Record participants' names in the form below and bookmark this page for your reference.



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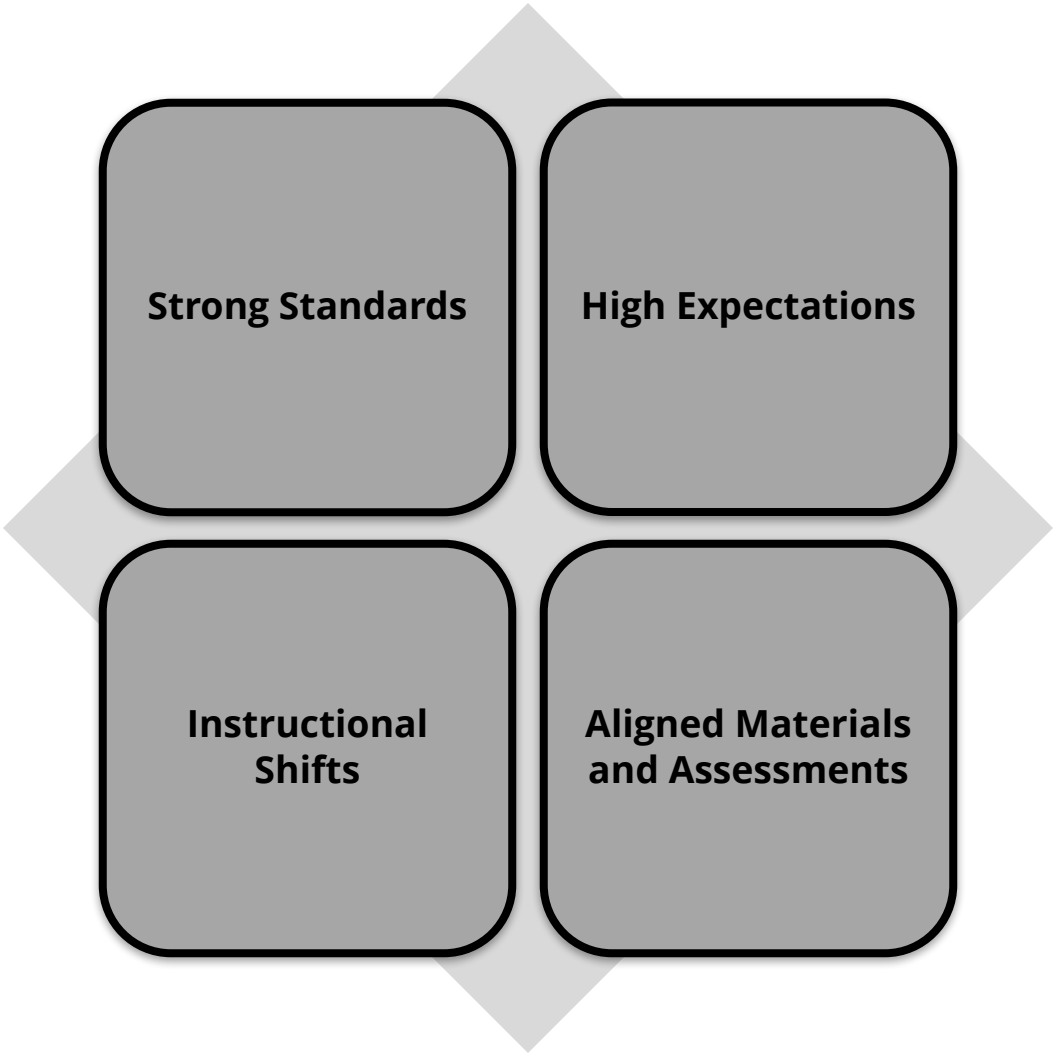
Key Ideas for Teacher Training



We know that Tennessee educators are working hard and striving to get better. This summer's teacher training is an exciting opportunity to learn about our state's newly adopted math and ELA standards and ways to develop a deeper understanding of the standards to improve classroom instructional practices. The content of this training is aligned to the standards and is designed to address the needs of educators across our state.

Throughout this training, you will find a series of key ideas that are designed to focus our work on what is truly important. These key ideas align to the training objectives and represent the most important concepts of this course.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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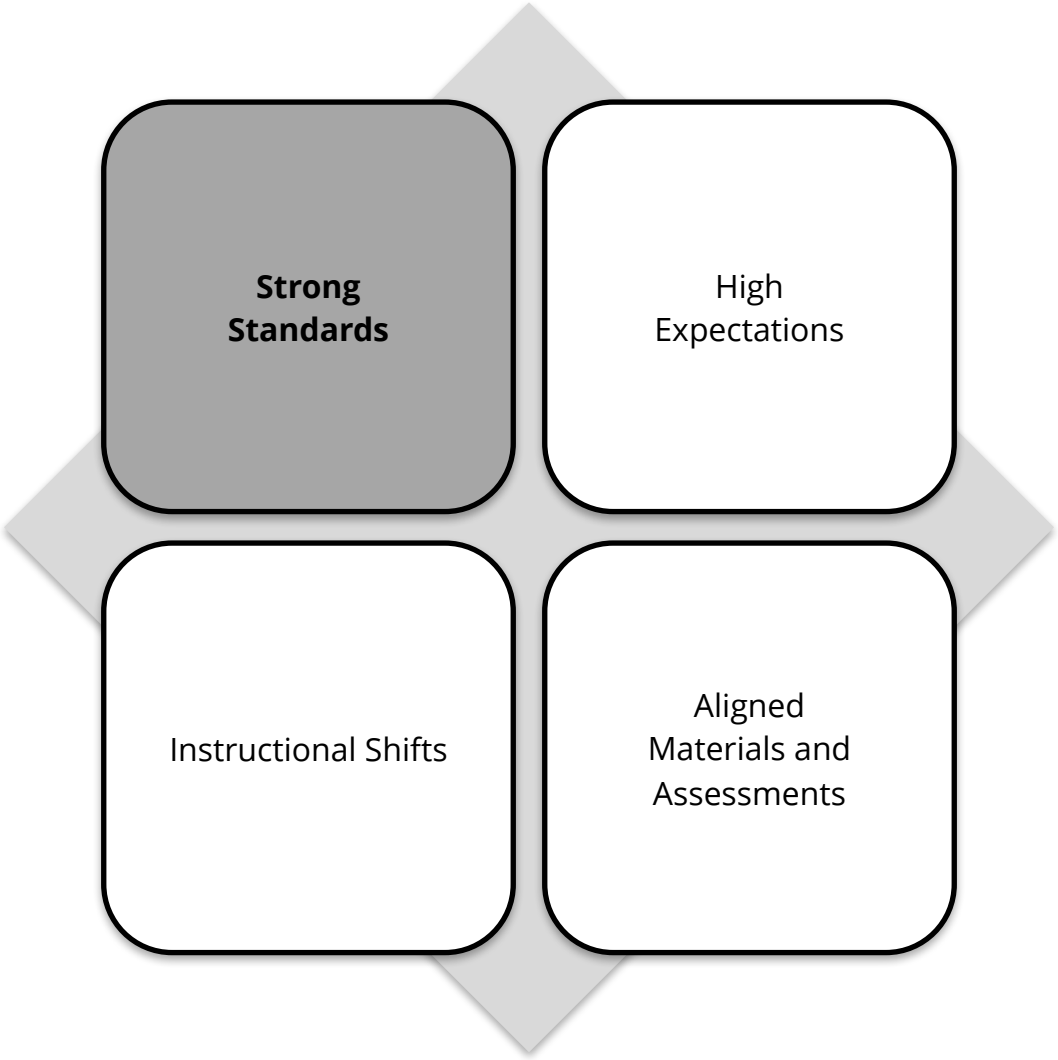
TAB PAGE

Part 1: The Standards

Module 1: The Standards Review Process



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Standards Review Process

The graphic below illustrates Tennessee's standards review process. Here you can see the various stakeholders involved throughout the process.

- The process begins with a website for public feedback.
- Tennessee educators who are experts in their content area and grade band serve on the advisory panels. These educators review all the public feedback and the current standards, then use their content expertise and knowledge of Tennessee students to draft a revised set of standards.
- The revised standards are posted for a second feedback collection from Tennessee's stakeholders.
- The Standards Recommendation Committee (SRC) consists of 10 members appointed by legislators. This group looks at all the feedback from the website, the current standards, and revised drafts. Recommendations are then made for additional revisions if needed.
- The SRC recommends the final draft to the State Board of Education for approval.

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Educator Advisory Team Members

Every part of the state was represented with multiple voices.

Timeline of Standards Adoptions and Aligned Assessments Implementation

Subject	Standards Proposed to State Board for Final Read	LEAs: New Standards in Classrooms	Aligned Assessment
Math	April 2016	2017–18	2017–18
ELA	April 2016	2017–18	2017–18
Science	October 2016	2018–19	2018–19
Social Studies	July 2017	2019–20	2019–20

Standards Revision Key Points

- The instructional shifts remain the same and are still the focus of the standards.
- The revised standards represent a stronger foundation that will support the progression of rigorous standards throughout the grade levels.
- The revised standards **improve connections:**
    - within a single grade level, and
    - between multiple grade levels.

"Districts and schools in Tennessee will exemplify excellence and equity such that all students are equipped with the knowledge and skills to successfully embark upon their chosen path in life."

What is your role in ensuring that all students are college and career ready?

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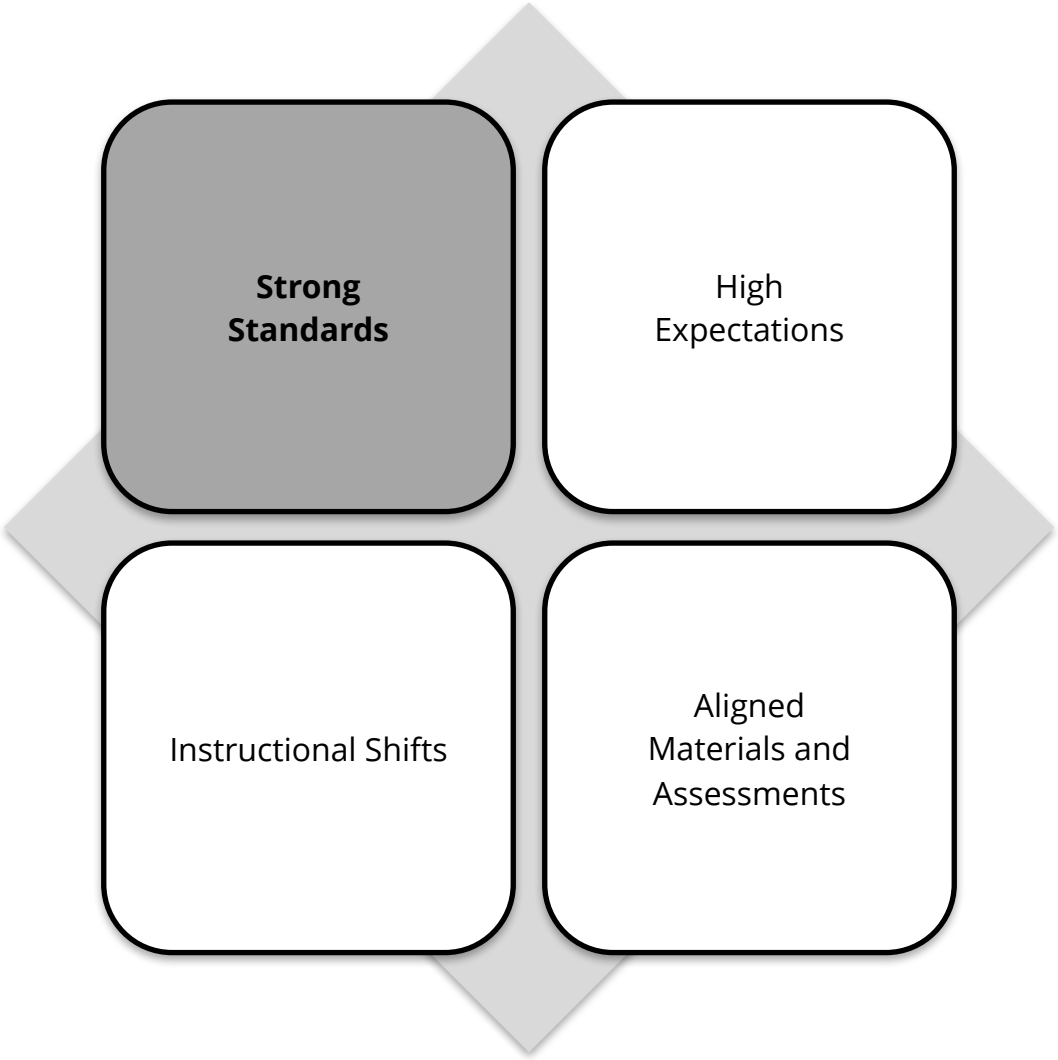
TAB PAGE

Part 1: The Standards

Module 2: The Tennessee Mathematics Academic Standards



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Goals

- Reinforce the continued expectations of the Tennessee Math Academic Standards.
- Revisit the three instructional shifts and their continued *and* connected role in the revised standards.
- Review the overarching changes of the revised Tennessee Math Academic Standards.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

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Instructional Shifts

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Aligned Materials and Assessments

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Setting the Stage

Directions:

1. Read and annotate the *General Introduction* to the TN Math Standards (pages 1–2) focusing on the "Mathematically Prepared" and "Conceptual Understanding, Procedural Fluency, and Application" sections.
2. After reading and annotating the two parts, write the sentence or phrase you felt was the most important in the box below and your rationale for choosing it.

Most Important Idea:
Rationale:
Key Ideas from Discussion:

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What Has NOT Changed

- Students **prepared** for college and career
- K–12 **learning progressions**
- Traditional and integrated **pathways** (for high school)
- Standards for **Mathematical Practice**
- **Instructional shifts**

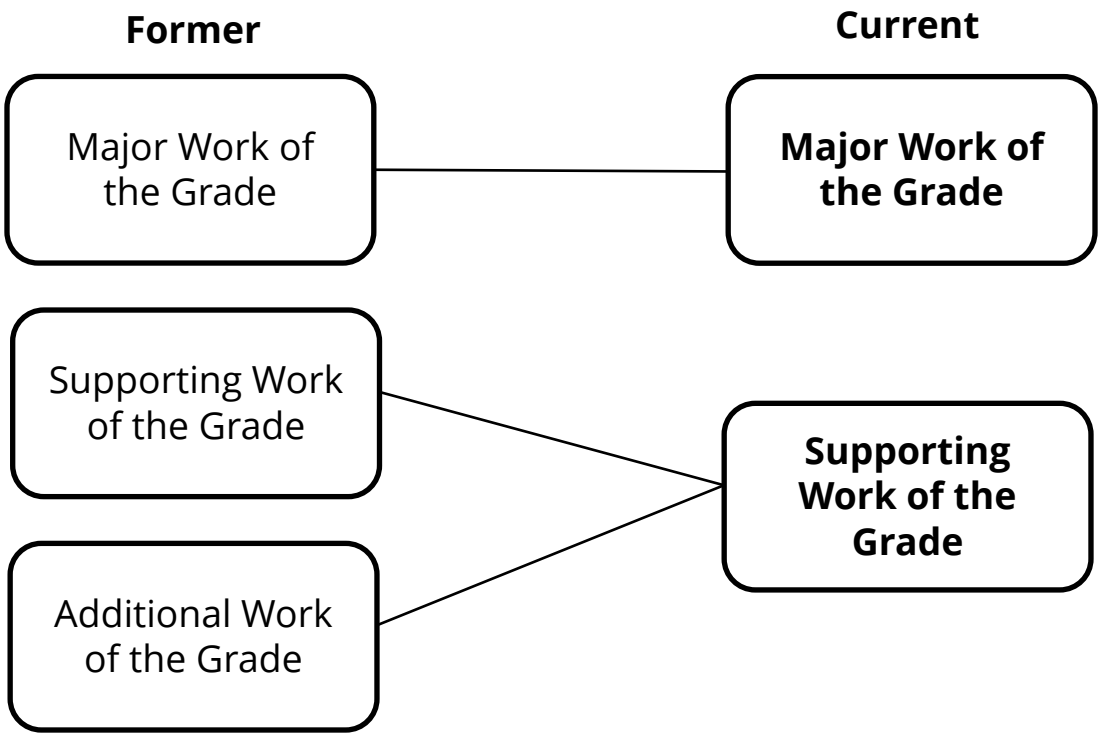
Notes:

What HAS Changed

- Category Change
- Revised Structured
- Coding & Nomenclature
- Literacy Skills for Mathematical Proficiency

What HAS Changed

Category Change



Notes:

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What HAS Changed

Revised Structure

Operations and Algebraic Thinking (OA)

Cluster Headings	Content Standards
A. Use the four operations with whole numbers to solve problems. (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations)	**4.OA.A.1** Interpret a multiplication equation as a comparison (e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations. **4.OA.A.2** Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison. *For example, school A has 300 students and school B has 600 students: to say that school B has two times as many students is an example of multiplicative comparison; to say that school B has 300 more students is an example of additive comparison.* **4.OA.A.3** Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
B. Gain familiarity with factors and multiples.	**4.OA.B.4** 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.
C. Generate and analyze patterns.	**4.OA.C.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Major Content | Supporting Content

Notes:

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What HAS Changed

Revised Structure

Cluster Headings	Content Standards	Scope & Clarifications
B. Solve equations and inequalities in one variable.	**A1.A.REI.B.3** Solve quadratic equations and inequalities in one variable. **a.** Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. **b.** Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions	*For A1.A.REI.B.3b:* *Tasks do not require students to write solutions for quadratic equations that have roots with nonzero imaginary parts. However, tasks can require the student to recognize cases in which a quadratic equation has no real solutions.* *Note: solving a quadratic equation by factoring relies on the connection between zeros and factors of polynomials. This is formally assessed in Algebra II.*
C. Solve systems of equations.	**A1.A.REI.C.4** Write and solve a system of linear equations in context.	*Solve systems both algebraically and graphically.* *Systems are limited to at most two equations in two variables.*

Notes:

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What HAS Changed

Coding and Nomenclature

4.OA.A.1

4	
OA	
A	
1	

5.NBT.A.2

5	
NBT	
A	
2	

Notes:

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What HAS Changed

Literacy Skills for Mathematical Proficiency

Communication in mathematics requires literacy skills in reading, vocabulary, speaking, listening, and writing. Students must be able to:

Literacy Skills for Mathematical Proficiency
1. Use multiple reading strategies.
2. Understand and use correct mathematical vocabulary.
3. Discuss and articulate mathematical ideas.
4. Write mathematical arguments.

Notes:

Module 2 Review

- Reinforce the continued expectations of the Tennessee Math Academic Standards.
- Revisit the three instructional shifts and their continued *and* connected role in the revised standards.
- Review the overarching changes of the revised Tennessee Math Academic Standards.

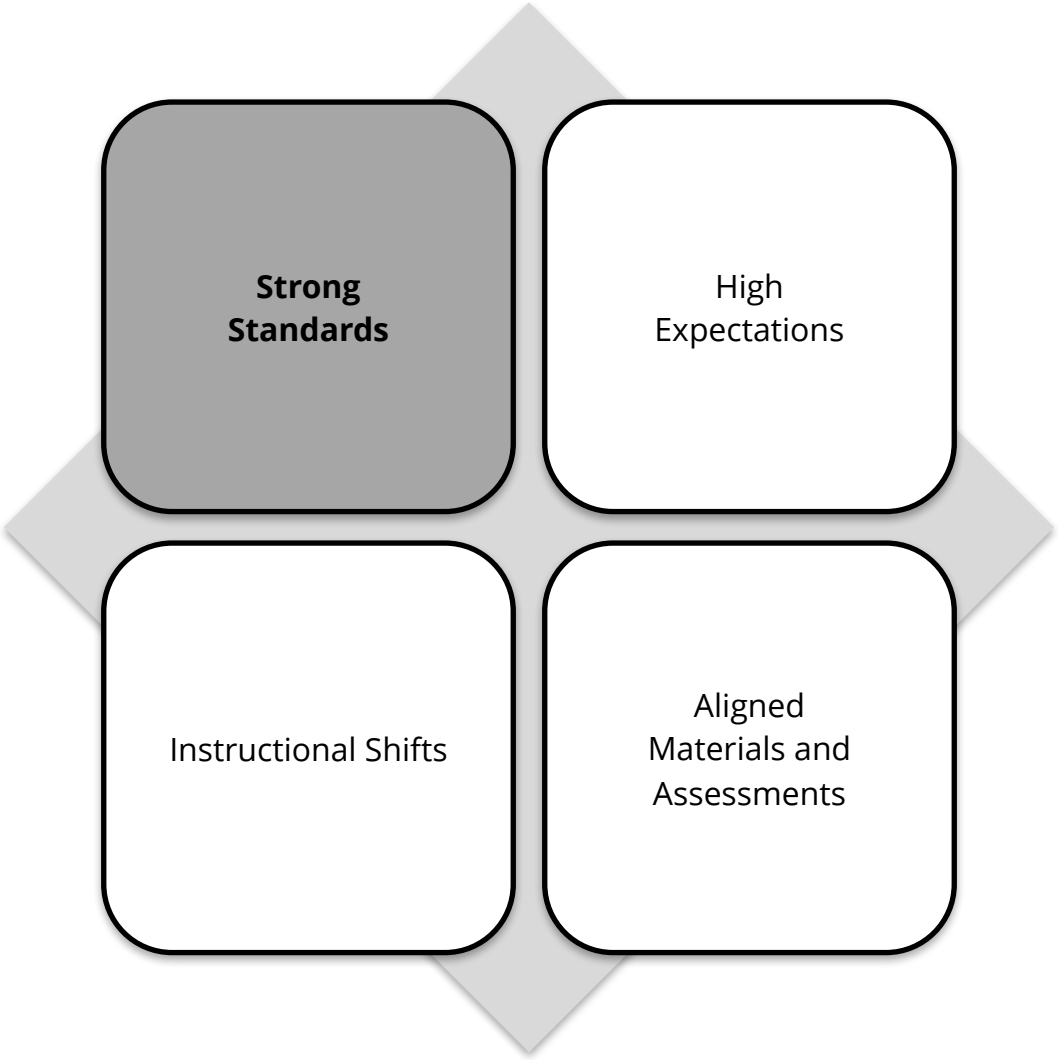
Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

TAB PAGE

Part 1: The Standards

Module 3: Summary of Revisions



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Goals

- Review a summary of revisions to the math standards by grade band.
- Compare 2016–17 standards to 2017–18 standards.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Why Standards?

"To assess student achievement accurately, teachers and administrators must know and understand the content standards that their students are to master. Again, we cannot teach or assess achievement that we have not defined."

—S. Chappuis, Stiggins, Arter, and J. Chappuis, 2006

What about this quotation sticks out to you?

Notes:

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Revisions to the Math Standards

Specific to K–5

- Refined for clarity
- Increased fluency expectations
- Revised examples

Overarching Revisions

- Supporting and additional work of the grade is combined as supporting work of the grade
- Increased fluency expectations

	Increased Fluency Expectations	
	Former Standard	Current Standard
Kindergarten	K.OA.5 Fluently add and subtract within 5.	K.OA.A.5 Fluently add and subtract within 10 using mental strategies.
First Grade	1.OA.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.	1.OA.C.6 Fluently add and subtract within 20 using mental strategies. By the end of Grade 1, know from memory all sums up to 10.
Second Grade	2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.	2.OA.B.2 Fluently add and subtract within 30 using mental strategies. By the end of Grade 2, know from memory all sums of two one-digit numbers and related subtraction facts.

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Revisions to the Math Standards

Specific to K–5

- Refined for clarity
- Increased fluency expectations
- Revised examples

Overarching Revisions

- Added/shifted a small number of standards to strengthen coherence across grade levels

	Former Standard	Current Standard
Kindergarten	No Past Standard	K.MD.B.3 Identify the penny, nickel, dime, and quarter and recognize the value of each.
First Grade	No Past Standard	1.MD.B.4 Count the value of a set of like coins less than one dollar using the ¢ symbol only.
Second Grade	2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.	2.MD.C.8 Solve contextual problems involving dollar bills, quarters, dimes, nickels, and pennies using ¢ and $ symbols appropriately.

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Revisions to the Math Standards

Specific to K–5

- Refined for clarity
- Increased fluency expectations
- Revised examples

Overarching Revisions

- Added/shifted a small number of standards to strengthen coherence across grade levels

	Former Standard	Current Standard
Fourth Grade	4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36),…	4.MD.A.1 Measure and estimate to determine relative sizes of measurement units within a single system of measurement involving length, liquid volume, and mass/weight of objects using customary and metric units.
Fifth Grade	5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	5.MD.A.1 Convert customary and metric measurement units within a single system by expressing measurements of a larger unit in terms of a smaller unit. Use these conversions to solve multi-step real world problems involving distances, intervals of time, liquid volumes, masses of objects, and money (including problems involving simple fractions or decimals). For example, 3.6 liters and 4.1 liters can be combined as 7.7 liters or 7700 milliliters.

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Revisions to the Math Standards

Specific to K–5

- Refined for clarity
- Increased fluency expectations
- Revised examples

Overarching Revisions

- Revised language to provide clarity and continuity
- Highlighted chart for–grade level mastery expectation for addition, subtraction, multiplication and division

Former Standard
2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Current Standard
2.NBT.A.3 Read and write numbers to 1000 using **standard form**, **word form**, and expanded form.

Former Standard
4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.

Current Standard
4.NBT.A.3 Round multi-digit whole numbers to any place **(up to and including the hundred-thousand place)** using understanding of place value.

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Focusing on Fluency in K–5

One-minute Free Write: What is fluency?

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Focusing on Fluency in K–5

All students should be able to recall and use their math education when the need arises. That is, a student should know certain math facts and concepts such as the multiplication table, how to add, subtract, multiply, and divide basic numbers, how to work with simple fractions and percentages, etc. There is a level of procedural fluency that a student's K–12 math education should provide him or her along with conceptual understanding so that this can be recalled and used throughout his or her life.

—Tennessee Academic Standards for Mathematics

What is Fluency?

- The ability to apply procedures _____ .
- Recognizing when one strategy or procedure is _____ to apply than another.
- Having opportunities to justify both informal strategies and commonly used procedures through distributed practice.
- Procedural fluency includes computational fluency with the four arithmetic operations. In the early grades, students are expected to develop fluency with whole numbers in addition, subtraction, multiplication, and division.

Definition of Fluency

Computational fluency refers to having efficient and accurate methods for computing. Students exhibit computational fluency when they demonstrate flexibility in the computational methods they choose, understand and can explain these methods, and produce accurate answers efficiently.

The computational methods that a student uses should be based on mathematical ideas that the student understands well, including the structure of the base-ten number system, properties of multiplication and division, and number relationships.

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Fluency Progression Chart

Focus	K	1	2	3	4	5
Add	Within 10 using mental strategies					

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Revisions to the Math Standards

Specific to 6–8

- Refined major work of the grade
- Revised supporting work of the grade, especially in statistics and probability

Overarching Revisions

- Slight revisions made to geometry in grade 8
- Supporting and additional work of the grade is combined as supporting work of the grade
- Revised language to provide clarity and continuity

Former Standard
6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Current Standard
6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center **(mean, median, mode)**, spread **(range)**, and overall shape.

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Revisions to the Math Standards

Specific to 6–8

- Refined major work of the grade
- Revised supporting work of the grade, especially in statistics and probability

Overarching Revisions

- Revised a small number of standards to strengthen coherence by condensing, expanding, and removing standards
- Revised a small number of statistics and probability standards

Former Standard

6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another. *For example, Susan is putting money in her savings account by depositing a set amount each week (50). Represent her savings account balance with respect to the number of weekly deposits (*s = 50w*, illustrating the relationship between balance amount* s *and number of weeks* w*).* Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Current Standard

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another. *For example, Susan is putting money in her savings account by depositing a set amount each week (50). Represent her savings account balance with respect to the number of weekly deposits (*s = 50w*, illustrating the relationship between balance amount* s *and number of weeks* w*).*

a. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

b. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

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Revisions to the Math Standards

Specific to 6–8

- Refined major work of the grade
- Revised supporting work of the grade, especially in statistics and probability

Overarching Revisions

- Revised a small number of standards to strengthen coherence by condensing, expanding, and removing standards
- Revised a small number of statistics and probability standards

Removed Standard

7.G.3 Describe the two-dimensional figures that result from slicing three dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Former Standard

6.SP.5c Summarize numerical data sets in relation to their context, such as by: c. Giving quantitative measures of center (median and/or mean) and variability **(interquartile range and/or mean absolute deviation)**, as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Current Standard

6.SP.B.5c Summarize numerical data sets in relation to their context, such as by: c. Giving quantitative measures of center (median and/or mean) and variability **(range)**, as well as describing any overall pattern with reference to the context in which the data were gathered.

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Revisions to the Math Standards

Specific to 9–12

- Refined and revised scope and clarifications
- Revisions for Algebra II and Integrated Math III
- Restructured additional math courses to reflect college and career readiness

Overarching Revisions

- Supporting and additional work of the grade is combined as supporting work of the grade
- Removed or shifted a small number of standards to the major work of the grade to streamline vertical progression
- Revised language and examples to provide clarity and continuity
- Shifted a small number of supporting work of the grade standards to additional mathematics courses

Former Standard
G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Current Standard
G.SRT.C.8a ***Know and*** use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Moved Standard
A2/M3.F.TF.5 to P.F.TF.A.4 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

This standard moved from Algebra II/Integrated III to Pre-Calculus.

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Revisions to the Math Standards

Specific to 9–12

- Refined and revised scope and clarifications
- Revisions for Algebra II and Integrated Math III
- Restructured additional courses to reflect college and career readiness

Overarching Revisions

- Restructured additional mathematics courses to reflect college and career readiness by removing three courses and adding “Applied Mathematical Concepts”

Rationale:

- High expectations
- Retention of rigorous standards
- Clearly defined and coherent pathways
- Equity and opportunity
- Aligned with student interest in postsecondary fields
- Shift to a discipline and career based pathway

Former:

- Advanced Algebra and Trigonometry
- Discrete Math
- Finite Math
- Bridge Math
- Pre-Calculus
- Statistics
- Calculus

Current:

- **Applied Mathematical Concepts**
- Bridge Math
- Pre-Calculus
- Statistics
- Calculus

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Revisions to the Math Standards

New Applied Mathematical Concepts Course

- For students interested in careers that use applied mathematics such as banking, industry, or human resources
- Rich problem solving experience
- Combines standards from Senior Finite Math and Discrete Mathematics
- Designed with industry needs in mind
- Alignment with first three math courses and ACT college and career readiness
- Possible dual credit exam

Problems in Applied Mathematical Concepts

AM.G.L.A.3: Solve a variety of logic puzzles

What's the easiest way to heat a pan of water for 9 minutes when you have only a 6-minute hour-glass timer and a 21-minute hour-glass timer?

AM.D.ID.A.2: Use a variety of counting methods to organize information, determine probabilities, and solve problems.

Given a group of students: G = {Allen, Brenda, Chad, Dorothy, Eric} list and count the different ways of choosing the following officers or representatives for student congress. Assume that no one can hold more than one office.

A president, a secretary, and a treasurer, if the president must be a woman and the other two must be men.

AM.N.NQ.B.6: Solve contextual problems involving financial decision-making.

The cash price of a fitness system is $659.99. The customer paid $115 as a down payment. The remainder will be paid in 36 monthly installments of $19.16 each. Find the amount of the finance charge.

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Revisions to the Math Standards

Standards Comparison Activity

Compare the former standards to the current standards.

Directions:

1. Highlight any changes you notice between the former standards and the current standards in the column on the right.

2. Use the included chart to compare the former standards with the current standards.

Notes:

Grade 3 Standards Comparison Activity

Coding	Former TN Standards	Revised TN Standards
3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.	3.OA.A.1 Interpret the factors and products in whole number multiplication equations (e.g., 4 x 7 is 4 groups of 7 objects with a total of 28 objects or 4 strings measuring 7 inches each with a total of 28 inches.)
3.OA.A.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.	3.OA.A.2 Interpret the dividend, divisor, and quotient in whole number division equations (e.g., 28 ÷ 7 can be interpreted as 28 objects divided into 7 equal groups with 4 objects in each group or 28 objects divided so there are 7 objects in each of the 4 equal groups).
3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem	3.OA.A.3 Multiply and divide within 100 to solve contextual problems, with unknowns in all positions, in situations involving equal groups, arrays, and measurement quantities using strategies based on place value, the properties of operations, and the relationship between multiplication and division (e.g., contexts including computations such as 3 x ? = 24, 6 x 16 = ?, ? ÷ 8 = 3, or 96 ÷ 6 = ?) (See Table 2 - Multiplication and Division Situations).
3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = ? ÷ 3, 6 × 6 = ?.*	3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers within 100. *For example, determine the unknown number that makes the equation true in each of the equations: 8 x ? = 48, 5 = ? ÷ 3, 6 x 6 =?*
3.OA.B.5	Apply properties of operations as strategies to multiply and divide.2 *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)* (Students need not use formal terms for these properties.)	3.OA.B.5 Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) *Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known (Commutative property of multiplication). 3 x 5 x 2 can be solved by (3 x 5) x 2 or 3 x (5 x 2) (Associative property of multiplication). One way to find 8 x 7 is by using 8 x (5 + 2) = (8 x 5) + (8 x 2). By knowing that 8 x 5 = 40 and 8 x 2 = 16, then 8 x 7 = 40 + 16 = 56 (Distributive property of multiplication over addition).*
3.OA.B.6	Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	3.OA.B.6 Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by*

		finding the number that makes 32 when multiplied by 8.
3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of 3rd grade, know from memory all products of two one-digit numbers and related division facts.
3.OA.D.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)	3.OA.D.8 Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations).
3.OA.D.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	3.OA.D.9 Identify arithmetic patterns (including patterns in the addition and multiplication tables) and explain them using properties of operations. For example, analyze patterns in the multiplication table and observe that 4 times a number is always even (because 4 x 6 = (2 x 2) x 6 = 2 x (2 x 6), which uses the associative property of multiplication) (See Table 3 - Properties of Operations).
3.NBT.A.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	3.NBT.A.1 Round whole numbers to the nearest 10 or 100 using understanding of place value.
3.NBT.A.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.
3.NF.A.1	Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.	3.NF.A.1 Understand a fraction, 1/b, as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction a/b as the quantity formed by *a* parts of size 1/b. For example, 3/4 represents a quantity formed by 3 parts of size 1/4.

3.NF.A.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.	3.NF.A.2 Understand a fraction as a number on the number line. Represent fractions on a number line. a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size $1/b$ and that the endpoint locates the number $1/b$ on the number line. For example, on a number line from 0 to 1, students can partition it into 4 equal parts and recognize that each part represents a length of 1/4 and the first part has an endpoint at ¼ on the number line. b. Represent a fraction a/b on a number line diagram by marking off *a* lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. For example, 5/3 is the distance from 0 when there are 5 iterations of 1/3.
3.NF.A.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, (e.g., 1/2 =2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. *c.* Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	3.NF.A.3 Explain equivalence of fractions and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line. b. Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3) and explain why the fractions are equivalent using a visual fraction model. c. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. For example, express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point on a number line diagram. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols >, =, or < to show the relationship and justify the conclusions.
3.MD.A.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve contextual problems involving addition and subtraction of time intervals in minutes. *For example, students may use a number line to determine the difference between the start time and the end time of lunch.*

3.MD.A.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).6 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	3.MD.A.2 Measure the mass of objects and liquid volume using standard units of grams (g), kilograms (kg), milliliters (ml), and liters (l). Estimate the mass of objects and liquid volume using benchmarks. For example, a large paper clip is about one gram, so a box of about 100 large clips is about 100 grams. Therefore, ten boxes would be about 1 kilogram.
3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	3.MD.B.3 Draw a scaled pictograph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled graphs.
3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units: whole numbers, halves, or quarters.
3.MD.C.5	Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.	3.MD.C.5 Recognize that plane figures have an area and understand concepts of area measurement. a. Understand that a square with side length 1 unit, called "a unit square," is said to have "one square unit" of area and can be used to measure area. b. Understand that a plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
3.MD.C.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	3.MD.C.6 Measure areas by counting unit squares (square centimeters, square meters, square inches, square feet, and improvised units).
3.MD.C.7	Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.	3.MD.C.7 Relate area of rectangles to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.

	b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* × *b* and *a* × *c. Use area models to represent the distributive property in mathematical reasoning.* d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and b + c is the sum of a x b and a x c. Use area models to represent the distributive property in mathematical reasoning. *For example, in a rectangle with dimensions 4 by 6, students can decompose the rectangle into 4 x 3 and 4 x 3 to find the total area of 4 x 6. (See Table 3 - Properties of Operations)* d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.
3.MD.D.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	3.MD.D.8 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	3.G.A.1 Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories.
3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*	3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area and describe the area of each part as 1/4 of the area of the shape.*
		3.G.A.3 Determine if a figure is a polygon.

Notation	Former TN Standards	Revised TN Standards
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	**4.OA.A.1** Interpret a multiplication equation as a comparison (e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations.
4.OA.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	**4.OA.A.2** Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison. *For example, school A has 300 students and school B has 600 students: to say that school B has two times as many students is an example of multiplicative comparison; to say that school B has 300 more students is an example of additive comparison.*
4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	**4.OA.A.3** Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
4.OA.4	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.	**4.OA.B.4** 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.
4.OA.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	**4.OA.C.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Grade 4 Standards Comparison Activity

4.NBT.A.1	1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that700 ÷ 70 = 10 by applying concepts of place value and division.*	**4.NBT.A.1** Recognize that in a multi-digit whole number (less than or equal to 1,000,000), a digit in one place represents 10 times as much as it represents in the place to its right. *For example, recognize that 7 in 700 is 10 times bigger than the 7 in 70 because 700 ÷ 70 = 10 and 70 x 10 = 700.*
4.NBT.A.2	2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**4.NBT.A.2** Read and write multi-digit whole numbers (less than or equal to 1,000,000) using standard form, word form, and expanded form (e.g. the expanded form of 4256 is written as 4 x 1000 + 2 x 100 + 5 x 10 + 6 x 1). Compare two multi- digit numbers based on meanings of the digits in each place and use the symbols >, =, and < to show the relationship.
4.NBT.A.3	3. Use place value understanding to round multi-digit whole numbers to any place.	**4.NBT.A.3** Round multi-digit whole numbers to any place (up to and including the hundred-thousand place) using understanding of place value.
4.NBT.B.4	4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.	**4.NBT.B.4** Fluently add and subtract within 1,000,000 using appropriate strategies and algorithms.
4.NBT.B.5	5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**4.NBT.B.5** Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NBT.B.6	6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**4.NBT.B.6** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NF.1	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	**4.NF.A.1** Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{a \times n}{b \times n}$ or $\frac{a \div n}{b \div n}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. For example,

		$\frac{3}{4} = \frac{3\times2}{4\times2} = \frac{6}{8}$
4.NF.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**4.NF.A.2** Compare two fractions with different numerators and different denominators by creating common denominators or common numerators or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols >, =, or < to show the relationship and justify the conclusions.
4.NF.3	3. Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *b.* Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	**4.NF.B.3** Understand a fraction $\frac{a}{b}$ with a>1 as a sum of fractions $\frac{1}{b}$. For example, $\frac{4}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$. **a.** Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. **b.** Decompose a fraction into a sum of fractions with the same denominator in more than one way (e.g. $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8}$) recording each decomposition by an equation. Justify decompositions by using a visual fraction model. **c.** Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction. **d.** Solve contextual problems involving addition and subtraction of fractions referring to the same whole and having like denominators
4.NF.4	4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. *a.* Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4),*	**4.NF.B.4** Apply and extend previous understandings of multiplication as repeated addition to multiply a whole number by a fraction.

	recording the conclusion by the equation 5/4 = 5 × (1/4). *b.* Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* *c.* Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	**a.** Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. *For example, use a visual fraction model to represent* $\frac{5}{4}$ *as the product* $5\times\frac{1}{4}$*, recording the conclusion by the equation* $\frac{5}{4}=5\times\frac{1}{4}$. **b.** Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$ and use this understanding to multiply a whole number by a fraction. *For example, use a visual fraction model to express* $3\times\frac{2}{5}$ as $6\times\frac{1}{5}$, recognizing this product as $\frac{6}{5}$. (In general, $\times\frac{a}{b}=\frac{(n\times a)}{b}=(n\times a)\times\frac{1}{b}$. **c.** Solve contextual problems involving multiplication of a whole number by a fraction (e.g., by using visual fraction models and equations to represent the problem). *For example, if each person at a party will eat* ^{3} *of a pound of roast beef, and there will be 4 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*
4.NF.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)	**4.NF.C.5** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express* $\frac{3}{10}$ *as* $\frac{30}{100}$ *and add* $\frac{3}{10}+\frac{4}{100}=\frac{34}{100}$
4.NF.6	Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*	**4.NF.C.6** Read and write decimal notation for fractions with denominators 10 or 100. Locate these decimals on a number line.
4.NF.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the	**4.NF.C.7** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals

	results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	refer to the same whole. Use the symbols >, =, or < to show the relationship and justify the conclusions.
4.MD.A.1	1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*	**4.MD.A.1** Measure and estimate to determine relative sizes of measurement units within a single system of measurement involving length, liquid volume, and mass/weight of objects using customary and metric units.
4.MD.A.2	2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	**4.MD.A.2** Solve one- or two-step real-world problems involving whole number measurements with all four operations within a single system of measurement including problems involving simple fractions.
4.MD.A.3	3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	**4.MD.A.3** Know and apply the area and perimeter formulas for rectangles in real- world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*
4.MD.B.4	4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	**4.MD.B.4** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*
4.MD.C.5 (including parts a and b)	4. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points	**4.MD.C.5** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. a. Understand that an angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle.

	where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.	b. Understand that an angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees and represents a fractional portion of the circle.
4.MD.C.6	6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	**4.MD.C.6** Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
4.MD.C.7	7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	**4.MD.C.7** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems *(e.g., by using an equation with a symbol for the unknown angle measure)*.
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two- dimensional figures.	**4.G.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), and perpendicular and parallel lines. Identify these in two- dimensional figures.
4.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.	**4.G.A.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.
4.G.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	**4.G.A.3** Recognize and draw lines of symmetry for two-dimensional figures.

Grade 5 Standards Comparison Activity

Coding	Former TN Standards	Revised TN Standards
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.	5.OA.B.3 Generate two numerical patterns using two given rules. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences. a. Identify relationships between corresponding terms in two numerical patterns. For example, observe that the terms in one sequence are twice the corresponding terms in the other sequence. b. Form ordered pairs consisting of corresponding terms from two numerical patterns and graph the ordered pairs on a coordinate plane.
5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NBT.A.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	5.NBT.A.3 Read and write decimals to thousandths using standard form, word form, and expanded form (e.g., the expanded form of 347.392 is written as 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000)). Compare two decimals to thousandths based on meanings of the digits in each place and use the symbols >, =, and < to show the relationship.

Grade 5 Standards Comparison Activity

5.NBT.A.4	Use place value understanding to round decimals to any place.	5.NBT.A.4 Round decimals to the nearest hundredth, tenth, or whole number using understanding of place value.
5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.	5.NBT.B.5 Fluently multiply multi-digit whole numbers (up to three-digit by four-digit factors) using appropriate strategies and algorithms.
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	5.NBT.B.6 Find whole-number quotients and remainders of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations; assess the reasonableness of answers using estimation strategies. (Limit division problems so that either the dividend or the divisor is a whole number.)
5.NF.A.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.)	5.NF.A.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.)
5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.	5.NF.A.2 Solve contextual problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.
5.NF.B.3	Interpret a fraction as division of the numerator by the denominator a/b=a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction	5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b=a ÷ b). Solve contextual problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual

	models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	fraction models or equations to represent the problem. For example, if 8 people want to share 49 sheets of construction paper equally, how many sheets will each person receive? Between what two whole numbers does your answer lie?
5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) x q (3/5 x 6) as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b . For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.)	5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number or a fraction by a fraction. a. Interpret the product a/b x q as a x (q ÷ b) (partition the quantity q into b equal parts and then multiply by a). Interpret the product a/b x q as (a x q) ÷ b (multiply a times the quantity q and then partition the product into b equal parts). For example, use a visual fraction model or write a story context to show that 3/4 x 16 can be interpreted as 3 x (16 ÷ 4) or (3 x 16) ÷ 4. Do the same with 2/3 x 4/5 = 8/15. (In general, a/b x c/d = ac/bd.)
5.NF.B.5	Interpret multiplication as scaling (resizing), by: 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); 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 = (nxa)/(nxb)* to the effect of multiplying *a/b by 1*.	5.NF.B.5 Interpret multiplication as scaling (resizing). a. Compare 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. For example, the product of 1/2 and 1/4 will be smaller than each of the factors. b. Explain 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); explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relate the principle of fraction equivalence $\frac{a}{b} = \frac{(n \times a)}{(n \times b)}$ to the effect of multiplying $\frac{a}{b}$ by 1.
5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem.
5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.	5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole

	(Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) x 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	numbers by unit fractions. (Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. Use visual models and the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) x 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. Use visual models and the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	5.MD.A.1 Convert customary and metric measurement units within a single system by expressing measurements of a larger unit in terms of a smaller unit. Use these conversions to solve multi- step real world problems involving distances, intervals of time, liquid volumes, masses of objects, and money (including problems involving simple fractions or decimals). For example, 3.6 liters and 4.1 liters can be combined as 7.7 liters or 7700 milliliters.
5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Grade 5 Standards Comparison Activity

5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. Understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. Understand that a solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	5.MD.C.4 Measure volumes by counting unit cubes, us cubic cm, cubic in, cubic ft, and improvised units.
5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. b. Apply the formulas V = l x w x h and V = b x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume of right rectangular prisms. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes (e.g., to represent the associative property of multiplication). b. Apply the formulas V = l x w x h and V = B x h (where B represents the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number	5.G.A.1 Graph and label points using the first quadrant of the coordinate plane. Understand that the first number indicates the horizontal distance traveled along the x-axis from the origin, and the second number indicates the vertical distance traveled along the y-axis with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

	indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	5.G.B.3 Classify two-dimensional figures in a hierarchy based on properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.	

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Standards Comparison Chart

Standard Coding	Dropped from Course	Added to Course	Revised	No change

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Revisions to the Math Standards

Standards Comparison Activity

1. If you had to summarize the revisions to these selected standards in twenty words or less, what would you say?

Notes:
Small Group Consensus:
Whole Group Consensus:

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Appointment with Peers

Please meet with your first partner to discuss the following:

- How will these changes impact your classroom?
- What are your takeaways from modules 1–3?
- How does this align to your observation rubric?

Notes:

Module 3 Review

- The instructional expectations remain the same and are still the focus of the standards.
- The revised standards represent a stronger foundation that will support the progression of rigorous standards throughout the grade levels.
- The revised standards improve connections:
  - within a single grade level, and
  - between multiple grade levels.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

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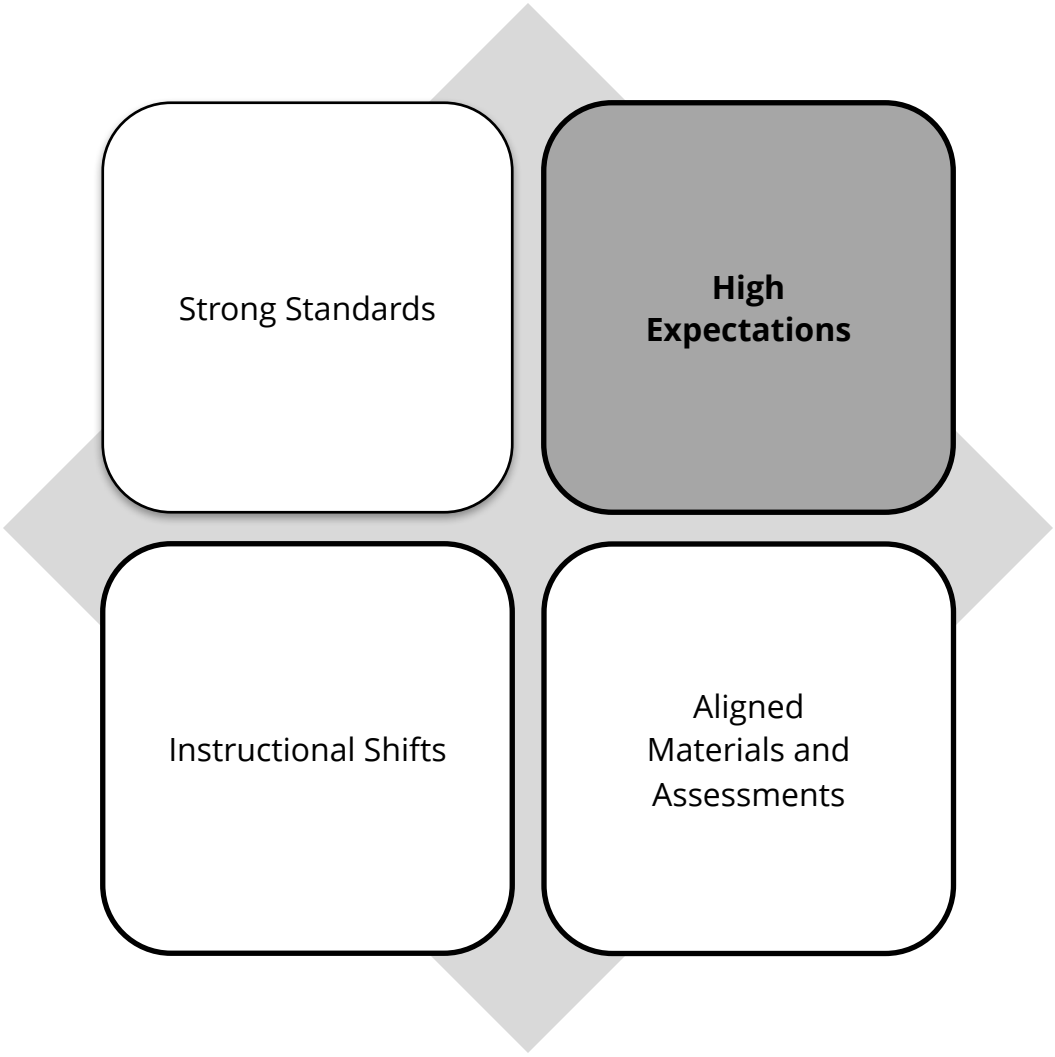
TAB PAGE

Part 2: Developing a Deeper Understanding

Module 4: Diving Into 3–5 Math



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Goals

- Concisely describe a course based on its introduction.
- Develop a means for deconstructing standards to determine the mathematical emphasis of the standard—its intent and purpose.
- Use the KUD approach to guide planning, instruction, and assessment.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Closer Look

Take a few minutes to read the overview page for your grade level and think about how this relates to the overarching revisions we have just seen.

Notes:

Now summarize your course in 140 characters. Write your tweet to inform others regarding what is included in your grade.

My Tweet:

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Intent and Purpose of the Standards

"With my ears to the ground, listening to my students, my eyes are focused on the mathematical horizon."

—Ball, 1993

Analyzing Standards

5.NF.B.5 Interpret multiplication as scaling (resizing).

a. Compare 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. For example, know if the product will be greater than, less than, or equal to the factors.

b. Explain 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); explain why multiplying a given number by a fraction less than 1 results in a product less than the given number; and relate the principle of fraction equivalence $\frac{a}{b} = \frac{a \times n}{b \times n}$ to the effect of multiplying $\frac{a}{b}$ by 1.

Notes:

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We are going to look closely at 5.NF.B.5.

Know (facts, vocabulary)	Understand (concepts, generalizations)	Do (verbs, skills)
Essential Questions:		
Instruction & Assessment (What does the math look like?)		

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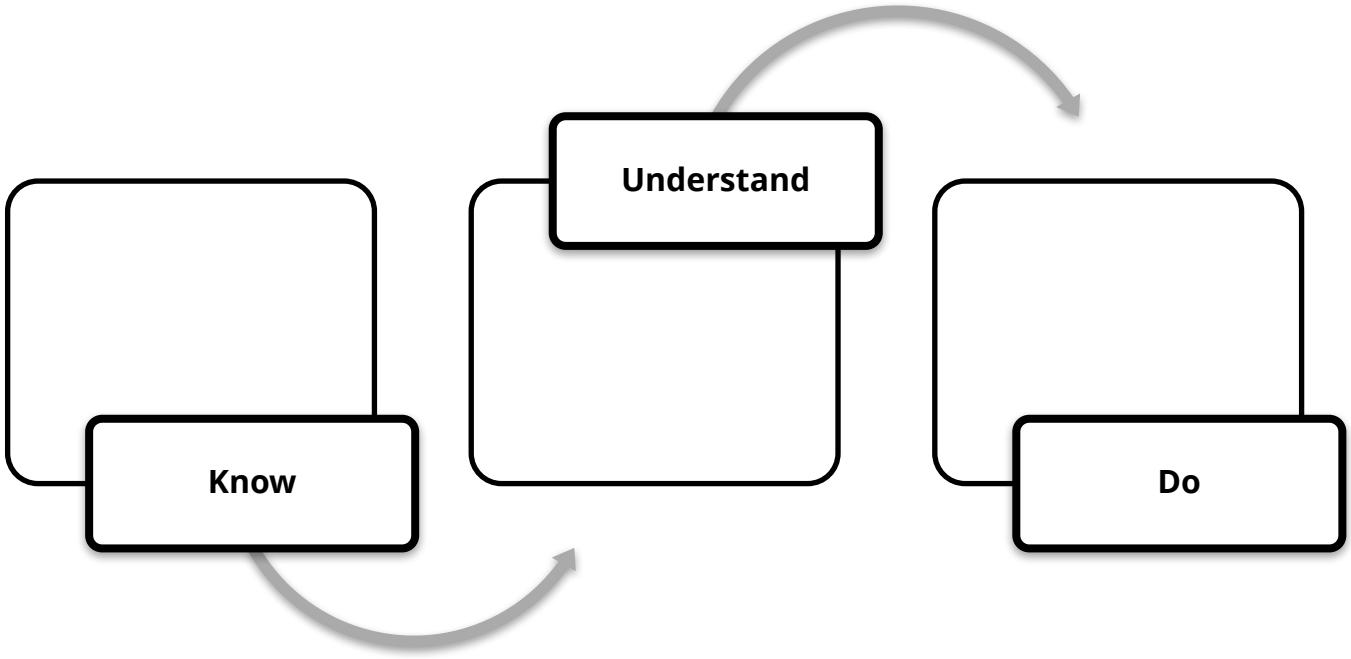
From Standard to Instruction: KUD

Know, Understand, and Do

- What is it that the standard wants the student to know, understand, and do?
- KUD – helps to maintain focus in differentiated instruction
  - **Know**: facts, vocabulary, properties, procedures, etc.
  - **Understand**: concepts, ideas, etc.
  - **Do**: tasks, approaches, assessment problems, etc.
- The two go together: What is the intent and purpose of the standard, and how do I put this into instructional form?



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You Try One.

Know (facts, vocabulary)	Understand (concepts, generalizations)	Do (verbs, skills)
Essential Questions:		
Instruction & Assessment (What does the math look like?)		

Module 4 Review

- Concisely describe a course based on its introduction.
- Develop a means for deconstructing standards to determine the mathematical emphasis, intent, and purpose of the standard.
- Use the KUD approach to guide planning, instruction, and assessment.

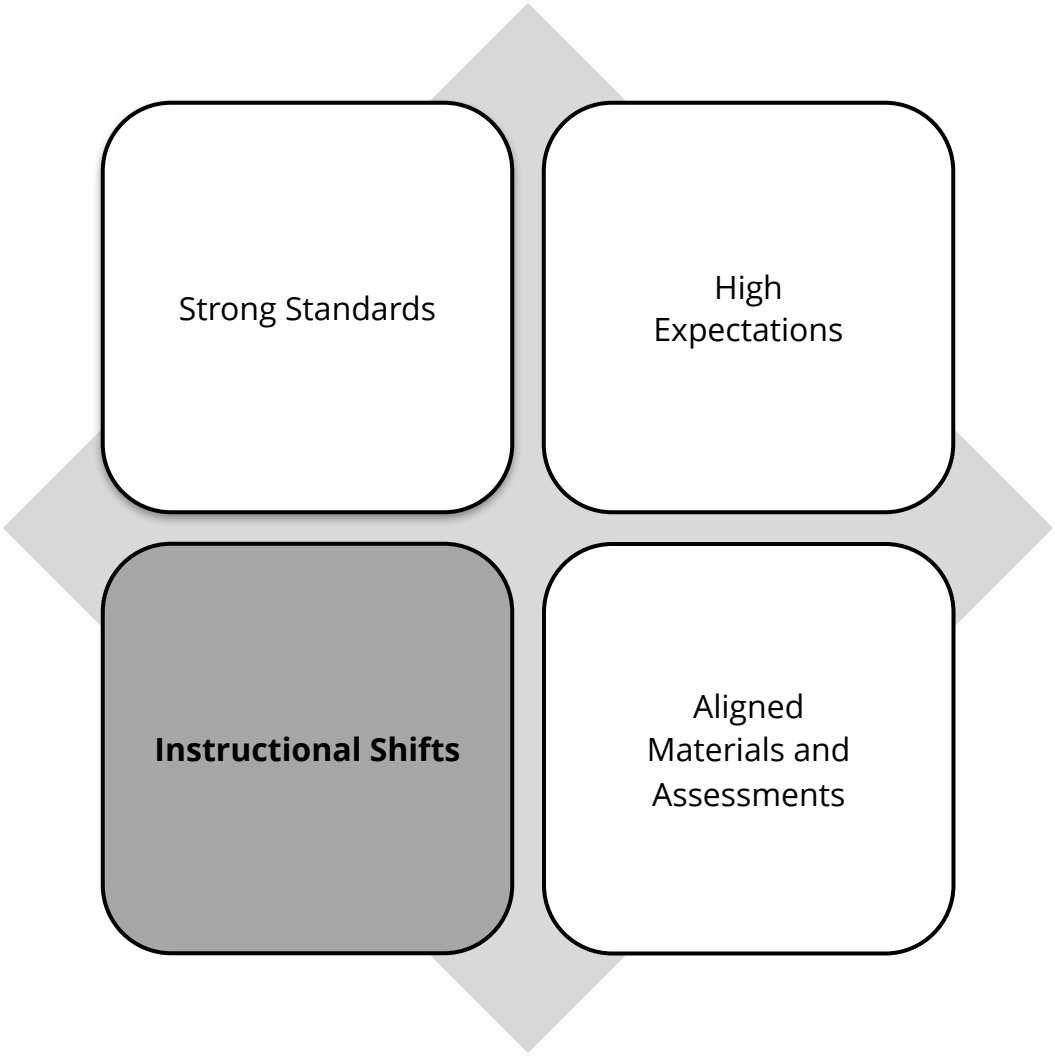
High Expectations

We have a continued goal to prepare students to be college and career ready.

TAB PAGE

Part 3: Instructional Shifts

Module 5: Revisiting the SMP's and Instructional Expectations



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Goals

- Revisit the concepts of focus, coherence, and rigor and how they play out in instruction.
- Discuss the purpose and place of the content and practice standards.
- Explore students' mathematical mindsets.
- Share instructional strategies related to the Standards for Mathematical Practice.
- Discuss research on the influence of mindsets in the math classroom.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Why Standards for Mathematical Practice?

"Beginning to experiment with small changes to one's teaching practice and collaborating with colleagues can help move students toward the vision of mathematical proficiency described in the Standards for Mathematical Practice"

—Mateas, 2016

- Tell us what students should know and be able to do
- So, what should students know and do?
    - Content Standards
    - Standards for Mathematical Practice
    - Literacy Skills
- **Knowing that these are *what* students need to learn, teachers determine *how* to teach these.**

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.

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Mindset

- The TN Academic Standards for Mathematics may seem challenging for students whose mindsets have been fixed by their past experiences in mathematics classrooms.
- As teachers, we are best positioned to influence students' mathematical mindsets through our actions and practices in the mathematics classroom.

_____ -Intelligence is a fixed trait. You cannot change it.

_____ -You can grow your intelligence through effort.

Notes:

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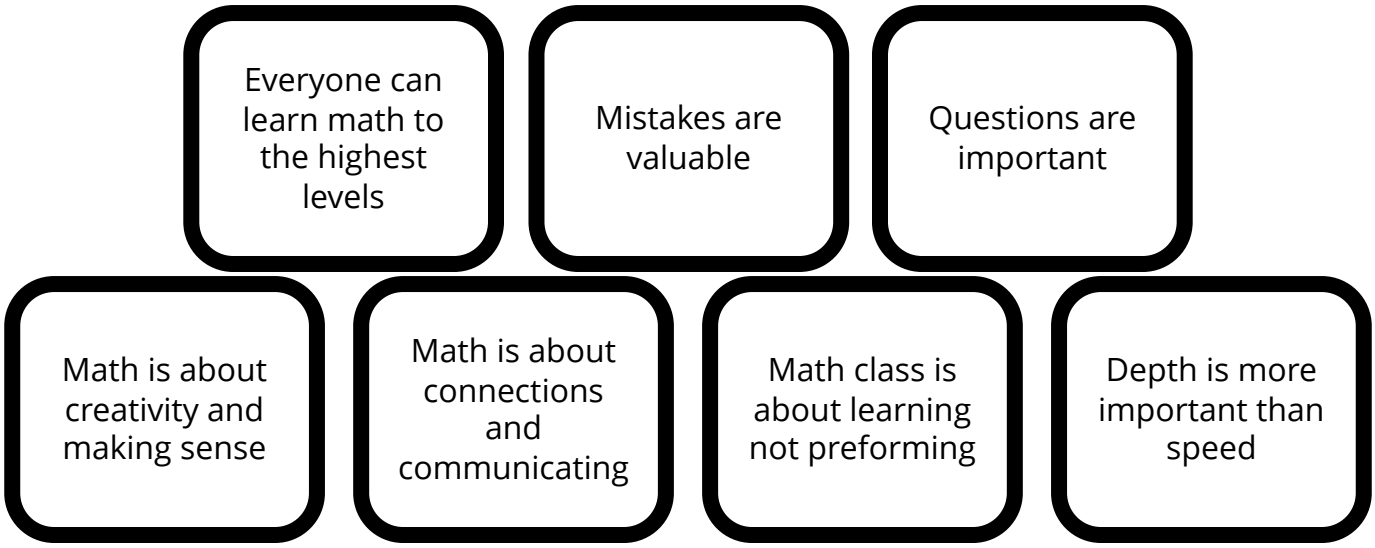
Why Address Mindsets?

"If there's a threat of being wrong every time I raise my hand, and being wrong is a bad thing, then very quickly I decide math isn't for me, I don't like this, I'm not a smart person."

—Noah Heller, Harvard Graduate School of Education, 2016



Notes:

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Instructional Expectations

Focus

1. In your grade-level groups, discuss ways you could respond if someone asks you the following question: “Why focus? There’s so much math that students could be learning. Why limit them?”

2. Review the table below and answer the questions, “Which two of the following represent areas of major focus for the indicated grade?”

3	Multiply and divide within 100	Identify the measures of central tendency and distribution	Develop understanding of fractions as numbers
4	Examine transformations on the coordinate plane	Generalize place value understanding for multi-digit whole numbers	Extend understanding of fraction equivalence and ordering
5	Understand and calculate probability of single events	Understand the place value system	Apply and extend previous understandings of multiplication and division to multiply and divide fractions

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Instructional Shifts

Coherence

In the space below, copy all of the standards for your assigned domain and note how coherence is evident in the vertical progression of these standards.

Grade	Standard	Summary of the Standard (If the standard has sub-parts, summarize each sub-part.)

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Instructional Shifts

Rigor

1. Make a true statement: *Rigor* = _____ + _____ + _____

2. In your groups, discuss ways to respond to one of the following comments: “These standards are expecting that we just teach rote memorization. Seems like a step backwards to me.” Or “I’m not going to spend time on fluency—it should just be a natural outcome of conceptual understanding.”

3. The shift towards rigor is required by the standards. Find and copy in the space below standards which specifically set expectations for each component of rigor.

Standard	Evidence

What do the instructional shifts look like in the classroom?

Module 5 Review

- We connected the instructional shifts to the standards and our classroom practices.
- We explored students' mathematical mindsets.
- We shared instructional strategies related to the Standards for Mathematical Practice.

Instructional Shifts

The instructional expectations are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

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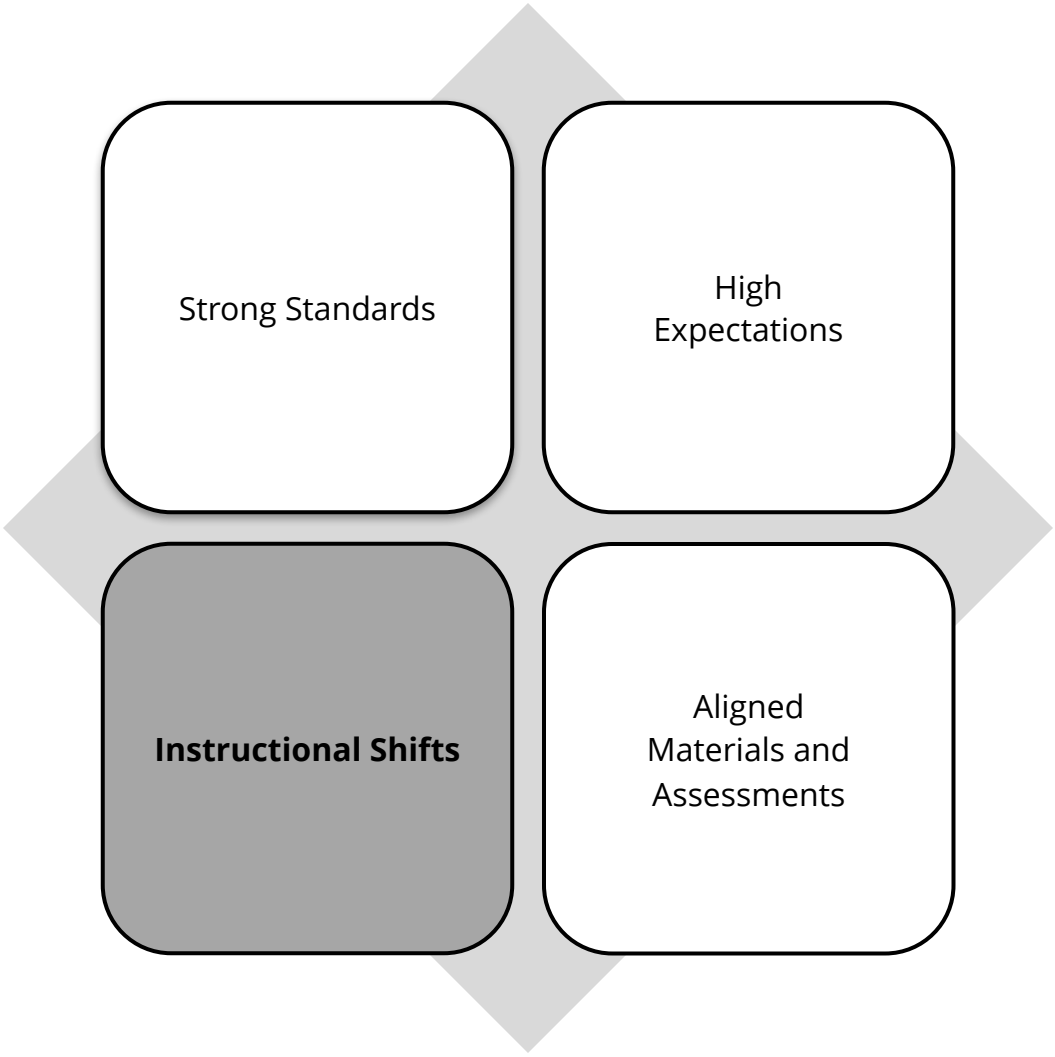
TAB PAGE

Part 3: Instructional Shifts

Module 6: Literacy Skills for Mathematical Proficiency



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Goal

- Develop a better understanding of the Literacy Skills for Mathematical Proficiency.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Literacy in your Math Classroom

Reflect on ways literacy skills are already present in your mathematics classroom.

Literacy Skills for Math Proficiency

Communication in mathematics requires literacy skills in reading, vocabulary, speaking, listening, and writing.

Literacy Skills for Mathematical Proficiency
1. Use multiple reading strategies.
2. Understand and use correct mathematical vocabulary.
3. Discuss and articulate mathematical ideas.
4. Write mathematical arguments.

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Literacy Skills for Math Proficiency

Categorize the strategies you listed and discussed with your table partners in the chart below.

Reading	
Vocabulary	
Speaking & Listening	
Writing	

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Literacy Skills for Mathematical Proficiency

1. Read and annotate your assigned section from pages 13–14 of the TN Math Standards. Work with your group to present this information to your colleagues.
2. Use the chart below to take notes and highlight the main ideas of each section.

Reading	
Vocabulary	
Speaking & Listening	
Writing	

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Four Stages of Word Knowledge

1. Students have never encountered the word before.
2. Students have seen/heard the word but do not know the definition.
3. Students know the word but rely on context to define it
4. Students know the word and can use it comfortably.

Mathematics Vocabulary

Notes:

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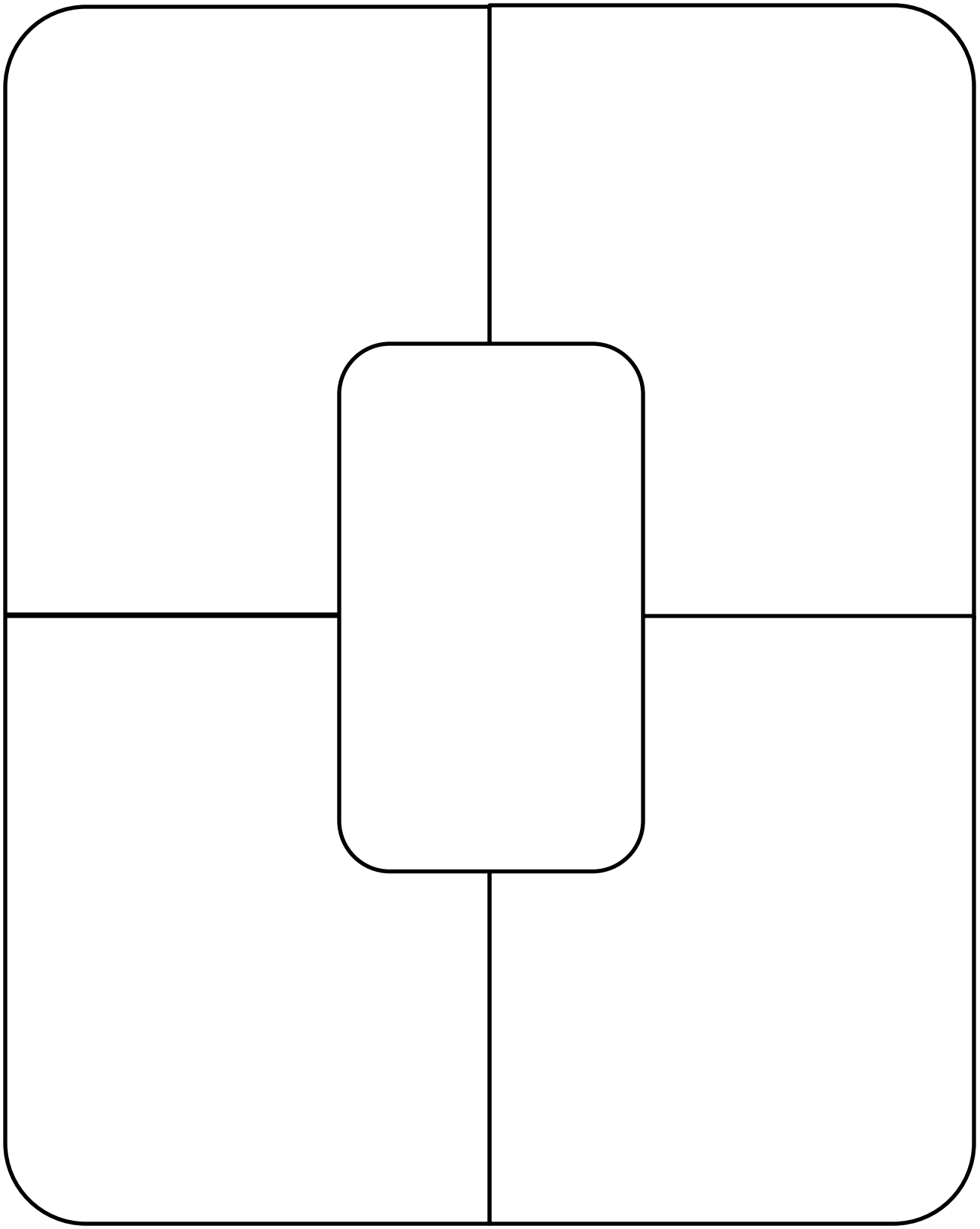
Making Connections



Module 6 Review

- Literacy skills in the math classroom will support students' understanding of the content standards.
- When students can read, write, and speak about math ideas, connections are made between concepts.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

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Appointment with Peers

Please meet with your second partner to discuss the following:

- What are your key takeaways from today?
- How does the align to your observation rubric?

Notes:

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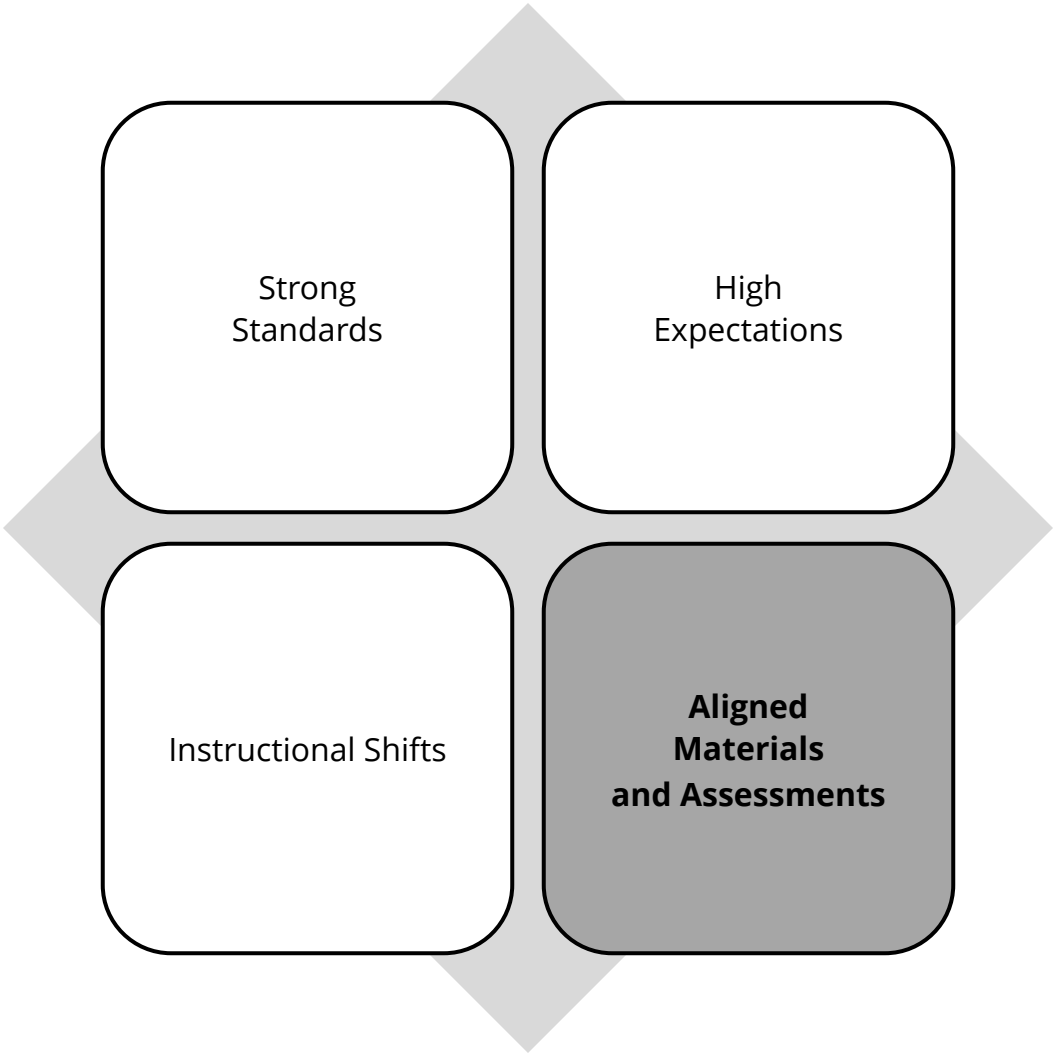
TAB PAGE

Part 4: Assessment and Materials

Module 7: Connecting Standards and Assessment



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Goals

- Discuss the role assessment plays in the integrated system of learning.
- Discuss the cycle of assessment.
- Discuss the areas of focus for standards-aligned assessments.
- Review and write mathematics assessment items.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

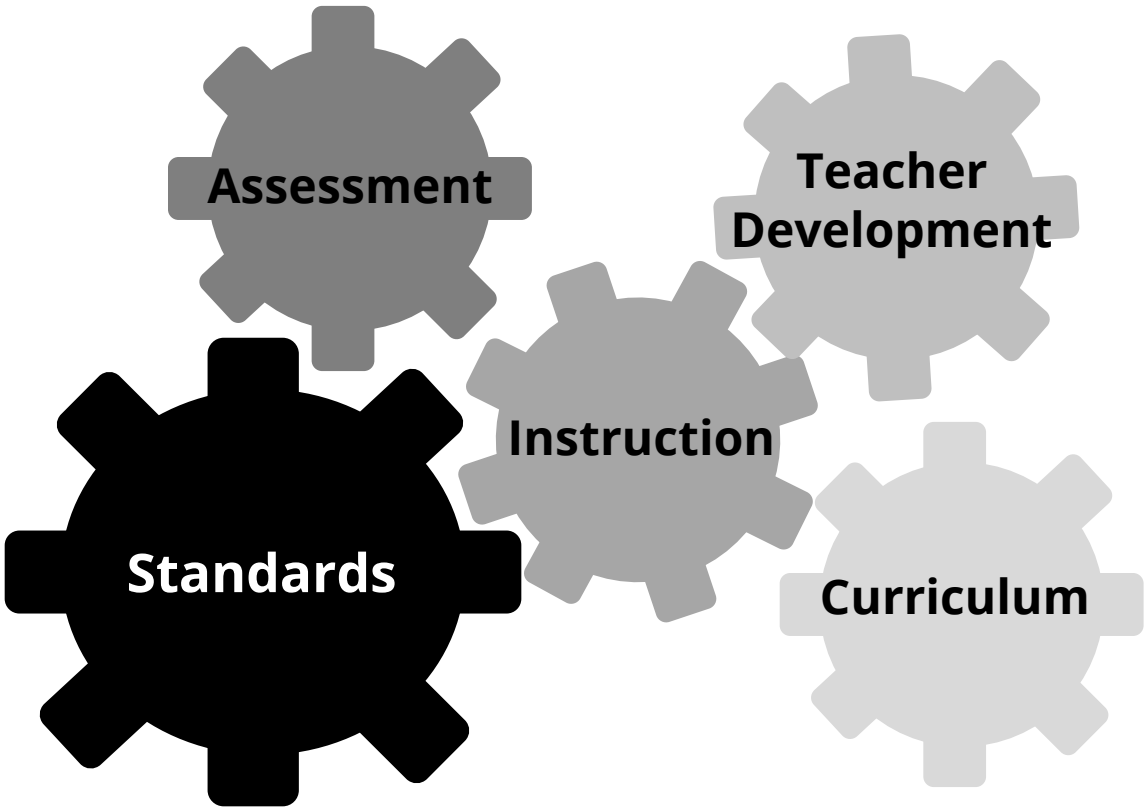
Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

Connecting Standards and Assessment



Assessment is

_____.

Considering this definition of assessment, what are educators "making a judgement about" when assessing students?

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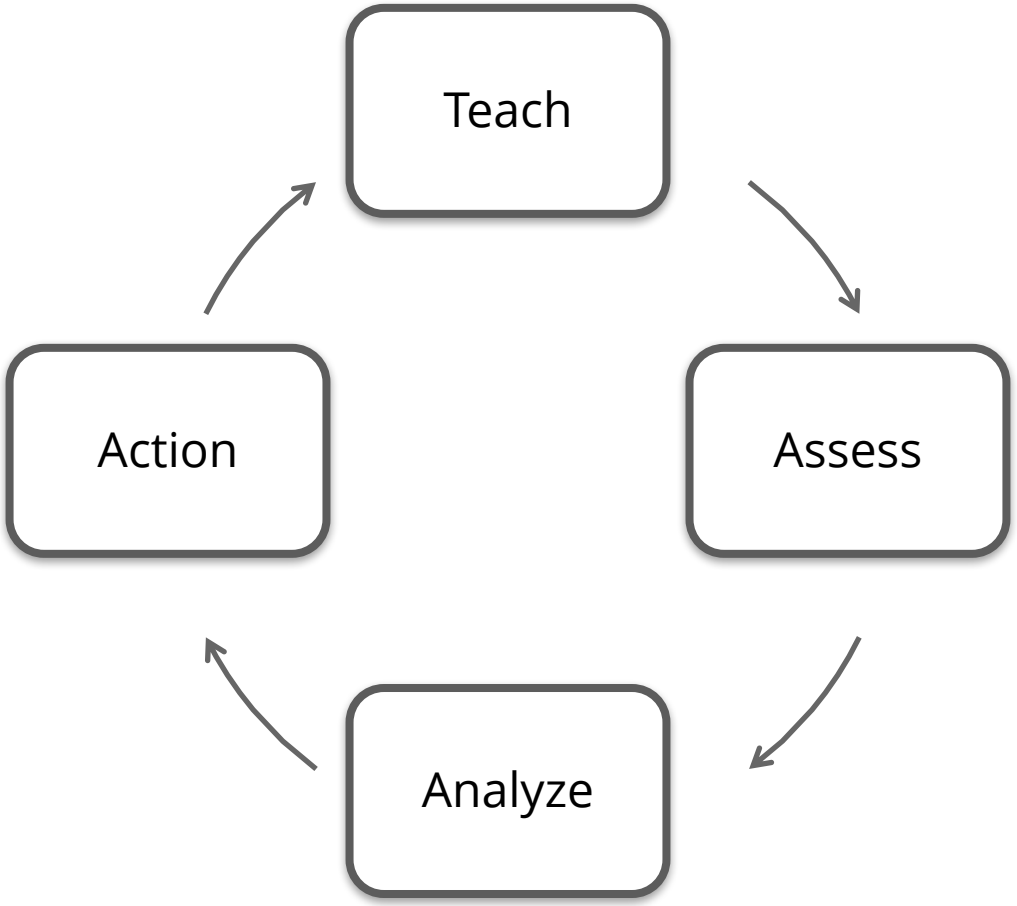
The Cycle of Assessment



"The good news is that research has shown for years that consistently applying principles of assessment for learning has yielded remarkable, if not unprecedented, gains in student achievement, especially for low achievers."

—Black & Wiliam, 1998

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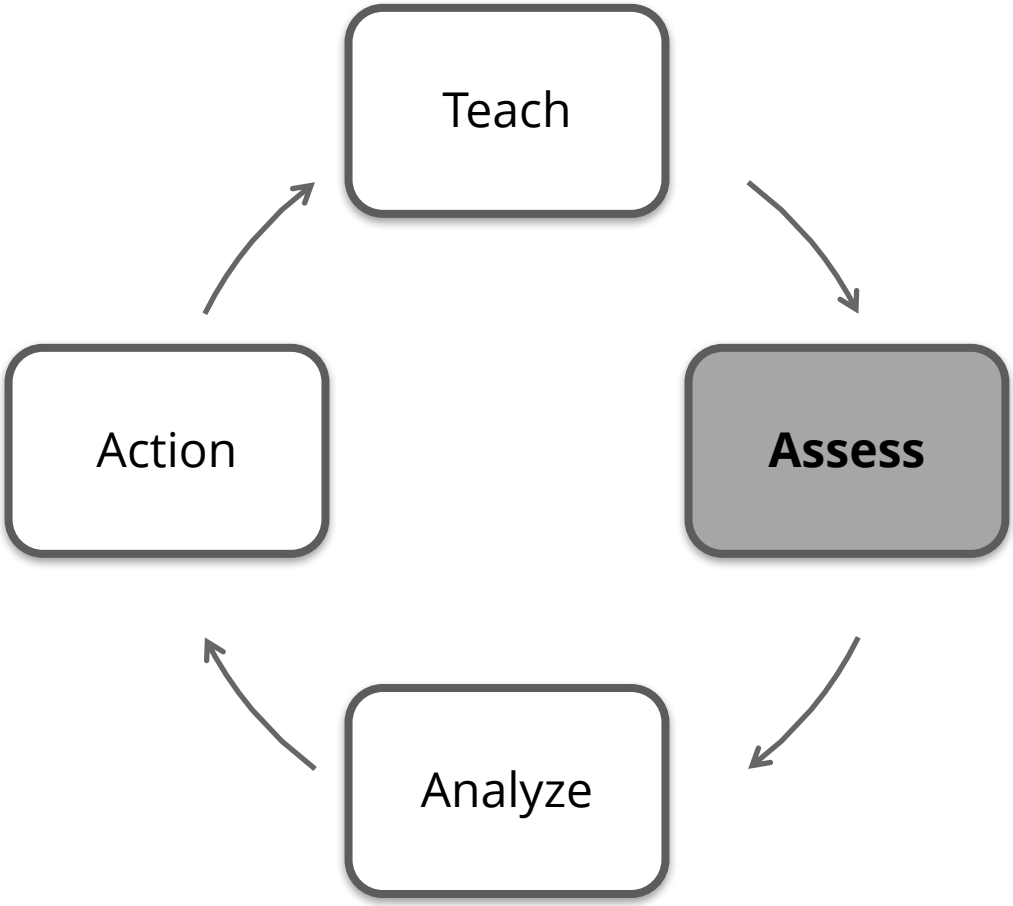
The Cycle of Assessment



Standards Aligned Assessment

Areas of Focus

1. Intent of the Assessment
    - Summative
    - Formative
2. Content and structure of Assessments
3. Analysis of Assessments

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Intent of Assessments

Areas of Focus

1. **Intent of the Assessment**
    - **Summative**
    - **Formative**
2. Content and Structure of Assessments
3. Analysis of Assessments

How are the results used?

Formative	Summative

"Benchmark assessments, either purchased by the district or from commercial vendors or developed locally, are generally meant to measure progress toward state or district content standards and to predict performance on large-scale summative tests. A common misconception is that this level of assessment is automatically formative."

—Stephen and Jan Chappuis 2012

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Intent of Assessments

Areas of Focus

1. Intent of the Assessment
    - Summative
    - Formative
2. **Content and Structure of Assessments**
3. Analysis of Assessments

Things to think about…

Universal Design Principles:

- No barriers
- Accessible for all students
- Upholds the expectations of our state standards

Notes:

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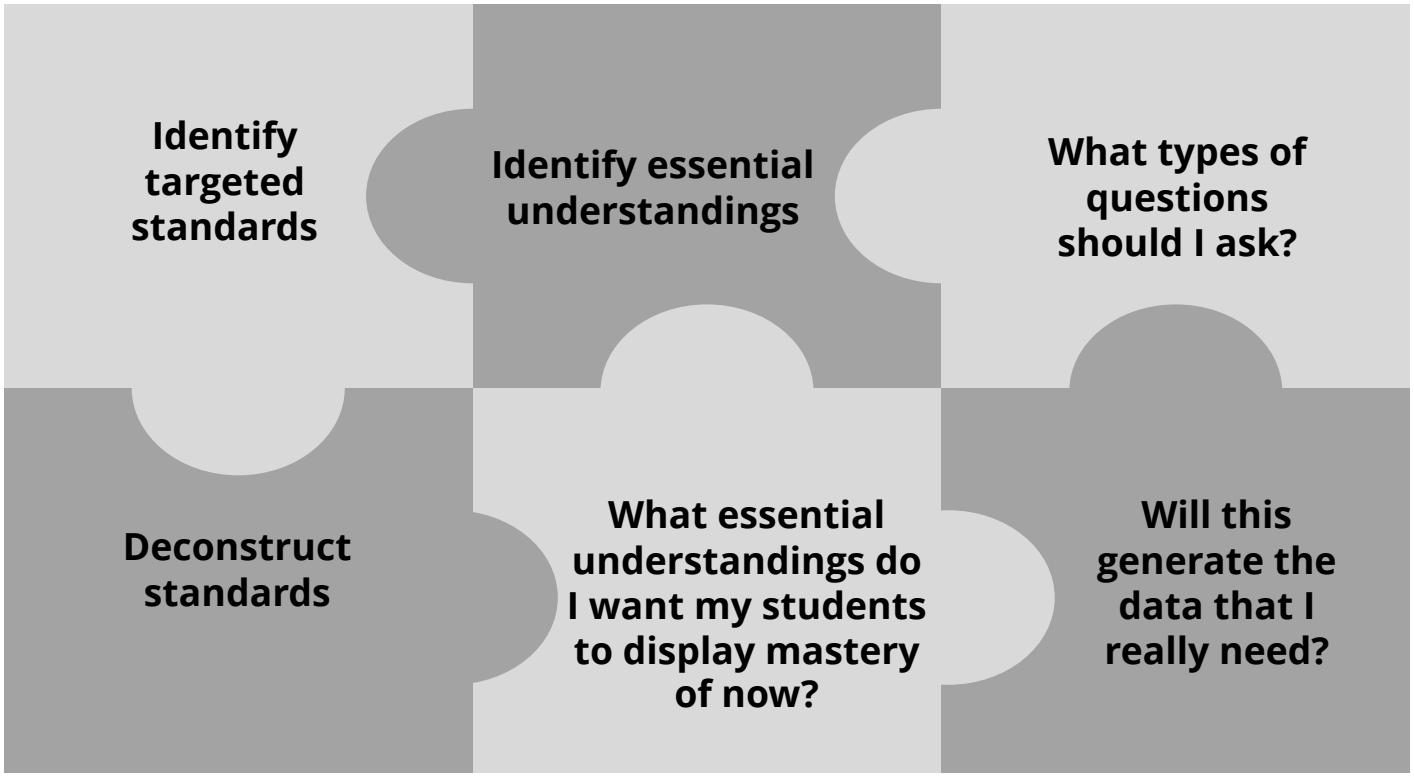
Developing a Classroom Assessment



Notes:

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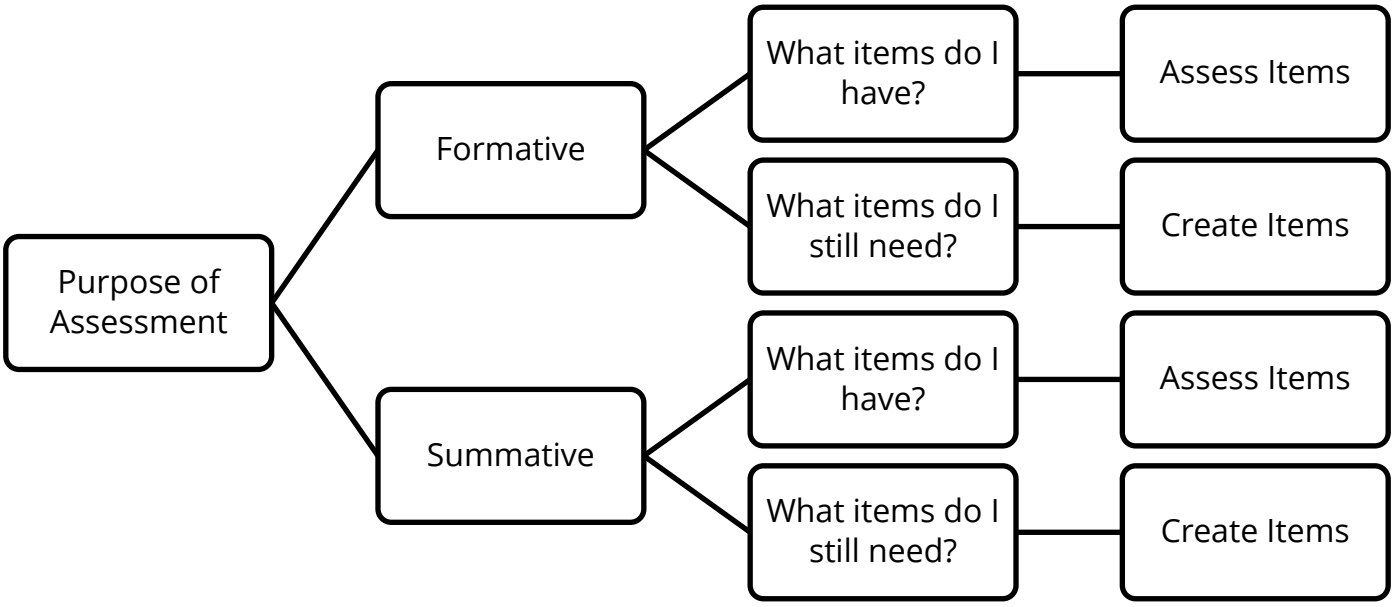
Inventory for a Classroom Assessment



Notes:

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Item Review

Standard:

4.OA.A.3: Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Which item is better?

Item 1: Samantha bought stickers.

- She bought 6 packs of stickers.
- Each pack has 12 stickers.
- She got 8 more stickers from a friend.

How many stickers does Samantha have in all?

A. 76
B. 78
C. 80
D. 82

Item 2: Samantha bought stickers.

- She bought 6 packs of stickers.
- Each pack has 12 stickers.
- She got 8 more stickers from a friend.

How many stickers does Samantha have in all?

A. 26
B. 64
C. 72
D. 80

Notes:

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Item Review

Assessment Terminology

Item Type

Selected response	
Open response	
Verbal	
Extended writing	

Item Components

Stimulus	
Stem	
Key	
Distractor	
Rational	

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Examining Items: Formative vs. Summative

- What is the question actually asking?
- Is the question aligned to the depth of the standard?
- Are the answers precise?
- Is the wording grade appropriate?
- Is the question aligned to the standard?
- Do the distractors give insight into student thinking?
- Is the entire standard assessed?
- Is the question precise?
- Is there a better way to assess the standard?

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Item Assessment Activity

For each of the provided formative assessment items, think about the things we just discussed. Would you include it on a formative assessment when paired with the provided standard?

You will be looking at five items. Decide if you would keep them, revise them in some way, or throw the item out all together. Look first at the items independently. Then you may work with a partner to complete the activity.

Item #1

4.MD.A.1

Measure and estimate to determine relative sizes of measurement units within a single system of measurement involving length, liquid volume, and mass/weight of objects using customary and metric units.

Samantha has a ribbon that is 3 feet long. How many inches long is Samantha's ribbon?

_____ inches

Item #2

5.OA.A.1

Use parentheses and/or brackets in numerical expressions and evaluate expressions having these symbols using the conventional order (Order of Operations).

Simplify the following Expression:

$$(4 + 8) \div \left(\frac{1}{6} + \frac{2}{3}\right)$$

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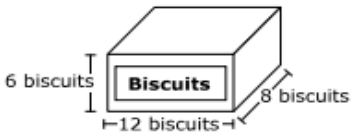
Item Assessment Activity

Item #3

5.MD.C.5a

Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes *(e.g., to represent the associative property of multiplication).*

The bakery sells biscuits to a restaurant in a rectangular prism-shaped box. One layer of biscuits in the box is 12 biscuits by 8 biscuits, and the box holds 6 layers of biscuits, as shown.



How many biscuits are in a full box? Enter your answer in the space provided.

Item #4

5.NBT.A.2

Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Which of the following is 456 multiplied by a power of 10?

A. 4056
B. 4560
C. 45.6
D. 4506

Item Assessment Activity

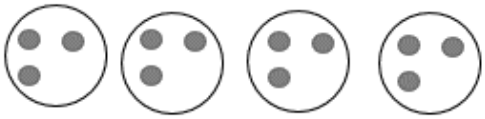
Item #5

3.OA.A.2

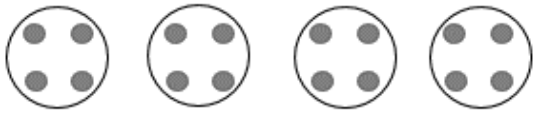
Interpret the dividend and divisor in whole number division expressions (e.g., 28 ÷ 7 can be interpreted as 28 objects divided into 7 equal groups or 28 objects divided so there are 7 objects in each group).

Which models represents the equation 12 ÷ 4 = 3? Choose **all** of the correct answers.

A.

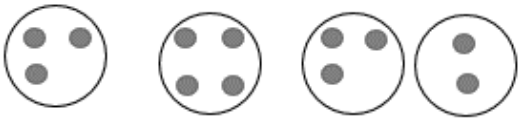


B.

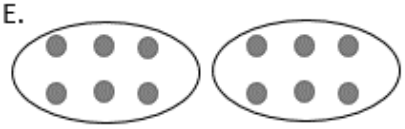


C.

D.



E.



Share one or two “ah-ha” moments from this activity with your neighbor.

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Creating Formative Items

Before you actually start writing items:

- Think about the purpose of the assessment as a whole. Is it formative or summative?
- Read the standards carefully with the assessment purpose in mind. Ask yourself: "What skills/knowledge are the standards asking the student to display?"
- Revisit the "I can" statements or "essential questions" you wrote for the standard(s). They may provide guidance as you write items.
- Brainstorm

Revisiting Standard 5.NF.B.5b

5.NF.B.5

Interpret multiplication as scaling (resizing).
b. Explain 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); explain why multiplying a given number by a fraction less than 1 results in a product less than the given number; and relate the principle of fraction equivalence $\frac{a}{b} = \frac{a \times n}{b \times n}$ to the effect of multiplying $\frac{a}{b}$ by 1.

FORMATIVE Assessment

	Less than 1	Equal to 1	Greater than 1
$\frac{2}{3}$			
$\frac{6}{5}$			
$\frac{8}{8}$			
$\frac{12}{7}$			
$\frac{3}{7}$			

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Creating Formative Items

Revisiting Standard 5.NF.B.5b

Determine if the product of two fractions will be greater than, less than, or equal to one of the factors and determine why.

Fill in the boxes with <, >, or =.

$\frac{8}{11} \times \frac{3}{5}$ ☐ $\frac{8}{11}$ because $\frac{3}{5}$ ☐ 1

$\frac{8}{11} \times \frac{5}{5}$ ☐ $\frac{8}{11}$ because $\frac{5}{5}$ ☐ 1

$\frac{8}{11} \times \frac{5}{3}$ ☐ $\frac{8}{11}$ because $\frac{5}{3}$ ☐ 1

Relate the principle of fraction equivalence to the effect of multiplying a fraction by 1.

$\frac{5}{6} \times ? = \frac{5}{6}$. Select **ALL** fractions the make the equation true.

A. $\frac{6}{5}$

B. $\frac{5}{5}$

C. $\frac{8}{8}$

D. $\frac{8}{5}$

E. $\frac{6}{6}$

Did we cover all aspects of the standard with these items?

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Review

- Formative Assessments *may* need items that scaffold in order for the teacher to diagnose what a student does/does not understand.
- Effectively writing "I can" or "essential questions" helps target assessment items specifically to standards.
- It is very difficult to formatively assess student understanding through a single item.
- Don't forget the principles of universal design.
- It's important to ask yourself the nine essential questions during item review or item writing.

Item Writing-Your Turn

- You will be provided a set of standards.
- You and a partner will be writing items to post for our gallery walk.
  - On selected response items you do not have to post the rationale for the distractors.
  - Please post the coding for the standard(s) to which your items are written.

Selected Response

Multiple Choice	Multiple Select

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Item Writing: Your Turn

Use this space to write out your standard(s) and assessment item(s).

Option 1	Option 2
1. Choose three of the standards. 2. Write an item to assess each standard that you would use on a formative assessment. 3. Try to write at least one multiple choice or multiple select item. Focus on writing distractors that provide instructional information.	1. Choose one standard. 2. Write three formative assessment items to the single standard that you selected. Make sure that each item requires students to demonstrate a different level of understanding of the standard. 3. Try to write at least one multiple choice or multiple select item. Focus on writing distractors that provide instructional information.

Gallery Walk

As you review your colleagues' items, look for similarities and differences in the items created.

Reflection

Reflect on your experience evaluating and creating assessment items and discuss the following:

- What was challenging about this experience?
- What did you learn from this experience?
- What supports do you need to better understand the relationship between standards and assessments in this way?

Notes:

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Analyzing Assessments

Areas of Focus

1. Intent of the Assessment
    - Summative
    - Formative
2. Content and Structure of Assessments
3. **Analysis of Assessments**

Analysis of Assessment

- Is the data _____ ?
- How is it analyzed?
- On which questions _____ ? Why?
- On which questions _____ ? Why?
- Were there issues with…

  _____

  _____

  _____ ?

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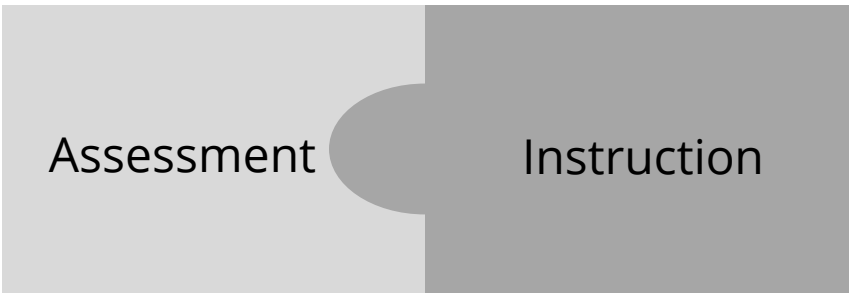
Taking Action



- How is instruction changing/adapting as a result of student data?
- Are results shared with all stakeholders (including students)?
- Are assessments adapted to address weaknesses found?

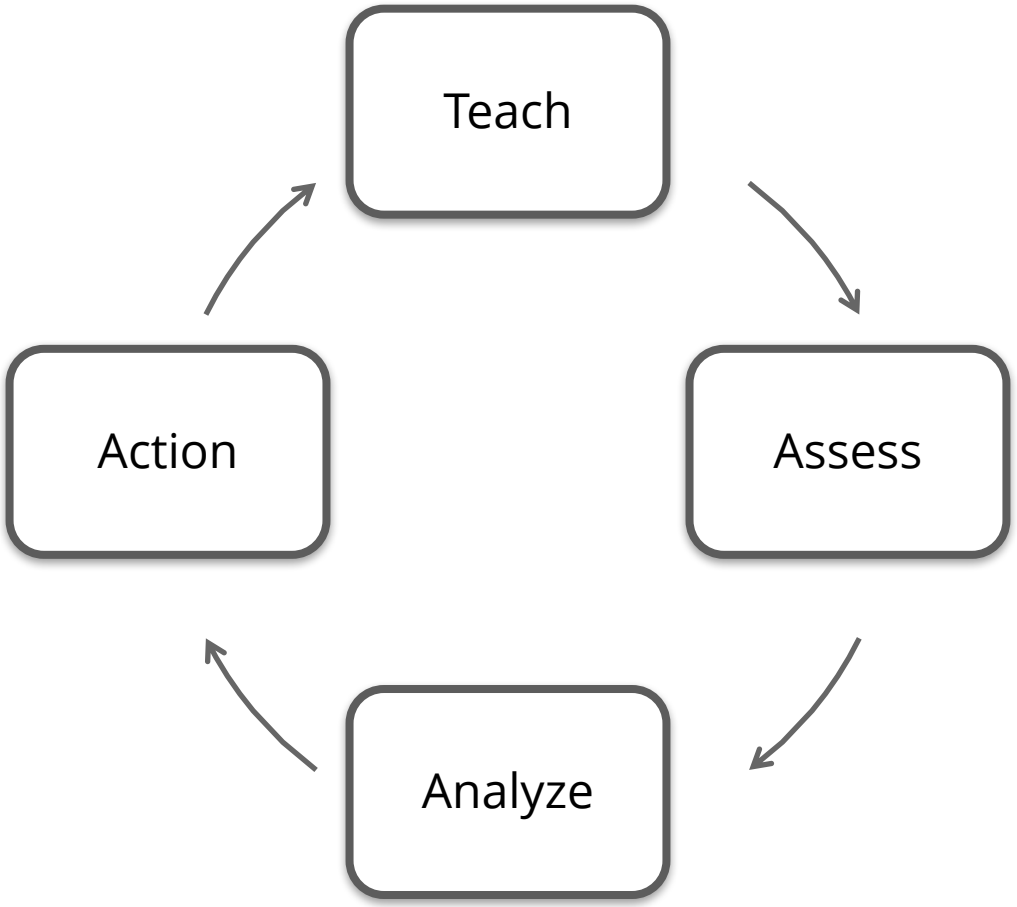
"The assessments will produce no formative benefit if teachers administer them, report the results, and then continue with instruction as previously planned."

—Stephen and Jan Chappuis, 2012

Notes:

Summary

The Cycle of Assessment



Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Appointment with Peers

Please meet with your third partner to discuss the following:

- What are your takeaways from module 7?
- How does this align to your observation rubric?

Notes:

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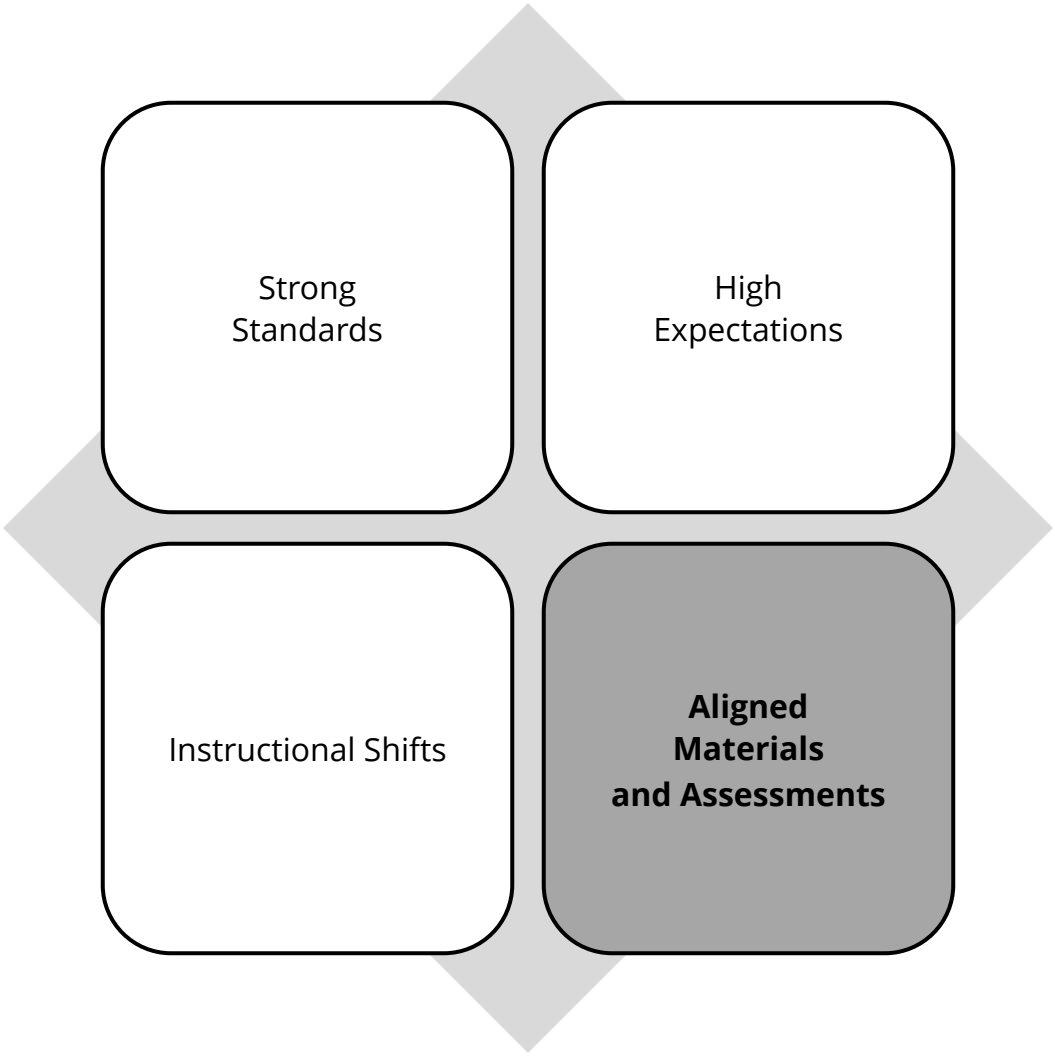
TAB PAGE

Part 4: Assessment and Materials

Module 8: Evaluating Instructional Materials



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Key Question

How do we know that our instructional materials address the depth of the content and the instructional shifts of focus, coherence, and rigor of the TN State Standards?

Goals

- Examine the TEAM rubric to define what is meant by standards based materials.
- Know which key criteria to use for reviewing materials, lessons, and/or units for alignment and quality.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Standards Based Materials and Practice

"...teachers have a responsibility to make day-to-day instructional choices that ensure that students work with problems that engage their interest and their intellect."

—Cathy L. Seeley, 2014

Reflect on Our Practice

When your students' work is on public display, in the hallway or shared with families, can anyone see the math?

Are the materials and the instructional practices you are using focused on the mathematics?

If anyone looked at your students' work, would they be able to see the math or would they be left asking "**where's the math?**"

Notes:

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Standards Based Materials and Practice

TEAM Connection
Activities & Materials

- Support the lesson objective
- Are challenging
- Sustain students' attention
- Elicit a variety of thinking
- Provide time for reflection
- Provide opportunities for student-to-student interaction
- Provide students with choices
- Incorporate technology
- Induce curiosity & suspense
- In addition sometimes activities are game-like, involve simulations, require creating products, and demand self-direction and self-monitoring.
- The preponderance of activities demand complex thinking and analysis
- Texts & task are appropriately complex

TEAM Connection
Problem Solving

- Abstraction
- Categorization
- Predicting Outcomes
- Improving Solutions
- Generating Ideas
- Creating & Designing
- Observing & Experimenting
- Drawing Conclusions/Justifying Solutions
- Identify Relevant/Irrelevant Information

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Standards Based Materials and Practice

Effective Mathematics Teaching Practices

1. Establish mathematics goals to focus learning.
2. Implement tasks that promote reasoning and problem solving.
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse.
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning mathematics.
8. Elicit and use evidence of student thinking.

Notes:

My Shape Monster Activity

- What content standard do you think these activities address?
- Where is the evidence of student understanding of the mathematical content?

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Standards Based Materials and Practice

My Shape Monster Activity

If a teacher was trying to address the depth of the **content standard 3.G.A.1,** would My Shape Monster accomplish this goal?

3.G.A.1 Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories.

Notes:

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Criteria for Alignment and Quality

Research

"A curriculum is more than a collection of activities."

—from the Curriculum Principle in *Principles and Standards for School Mathematics*

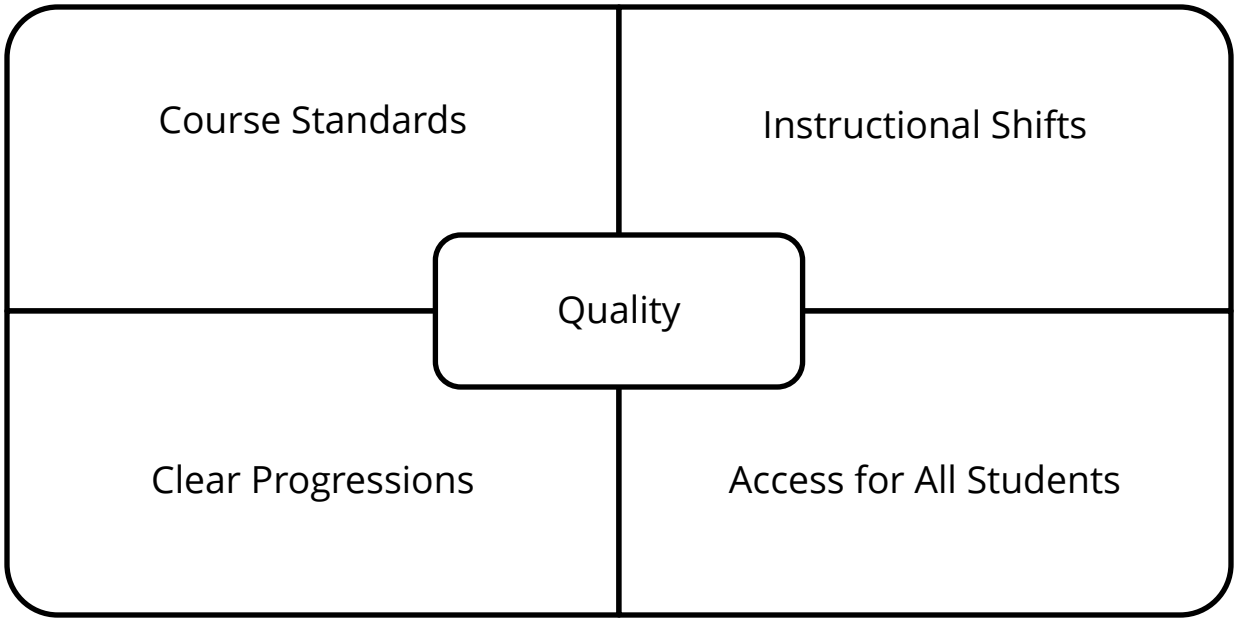
A **well-articulated curriculum** will:

- Make clear the most important mathematics of the grade level.
- Specify when concepts and skills are introduced and when they should be mastered.
- Detail how student conceptual understanding of big ideas develops across units and across multiple grade levels.

When choosing instructional materials, what should a teacher consider?

Notes:

Criteria for Alignment and Quality



Materials Review Instrument

When reviewing materials, it is important to have a deep understanding of the standards and a deep understanding of the review instrument before looking at the materials.

- Section I: Non-Negotiable Alignment Criteria
  - Part A: Standards
  - Part B: Shifts
    - Focus
    - Rigor
    - Coherence
- Section II: Additional Alignment Criteria and Indicators of Quality
  - Part A: Key areas of focus
  - Part B: Student engagement and instructional focus
  - Part C: Monitoring student progress

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Math Materials Review Instrument

SECTION I: NON-NEGOTIABLE ALIGNMENT CRITERIA		SECTION II: ADDITIONAL ALIGNMENT CRITERIA AND INDICATORS OF QUALITY		
Part A. Course Standards	Part B. Shifts in Instruction	Part A. Key Areas of Focus	Part B. Student Engagement and Instructional Supports	Part C. Monitoring Student Progress
Yes: Move to Part B No: Do not use or modify	Yes: Move to Section II No: Do not use or modify	Yes: Move to Section II:B No: Do not use or modify	Yes: Move to Section II:C No: Do not use or modify	Yes: Use materials No: Do not use or modify
The instructional materials represent 100 percent alignment with the Tennessee Math Standards and explicitly focus teaching and learning on the course standards at the rigor necessary for students to reach mastery.	1. Focus 2. Coherence 3. Rigor	Learning experiences provide opportunities for thought, discourse, and practice in an interconnected and social context. Units and instructional sequences are coherent and organized in a logical manner that builds upon knowledge and skills learned in prior grade levels or earlier in the grade. Materials support student communication within an ELA focus by providing consistent opportunities for students to utilize literacy skills for proficiency in reading, writing, vocabulary, speaking, and listening.	Material provides learning experiences that incorporate the course standards, Standards for Mathematical Practice, and Literacy Skills for Mathematical Proficiency. Material engages students through real-world, relevant, thought-provoking questions, problems, and tasks that stimulate interest and elicit critical thinking and problem solving. Material integrates appropriate supports for students who are ELL, have disabilities, or perform below grade level. Material includes differentiated materials that provide support for students approaching mastery as well as extensions for students already meeting mastery or with high interest.	Assessments provide data on the content standards. Material assesses student mastery using methods that are unbiased and accessible to all students. Material includes aligned rubrics or scoring guidelines that provide sufficient guidance for interpreting student performance. Material uses varied modes of curriculum embedded assessments that may include pre-, formative, summative, and self-assessment measures. Assessments are embedded throughout instructional materials as tools for students' learning and teachers' monitoring of instruction. Assessments provide teachers with a range of data to inform instruction.

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Evaluating Instructional Materials: Best Practices

- It's important to review instructional materials you use to determine where you have strong alignment to standards and where you may have gaps to fill.
- School leaders and teachers should engage in reviewing instructional materials on an ongoing basis to develop pedagogy and capacity.

Teachers need to review materials when:

- There is a new adoption.
- Current materials have gaps that may require supplemental materials.
- They are looking for supplemental instructional materials.

Notes:

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Supplemental Materials

Let's Discuss:

- What resources do you have on hand?
- Where do you find supplemental materials?
- How can you use this process to evaluate supplemental materials?

Reviewing Materials: A Recap

As you look for materials...

- Is it aligned to the standards?
- Does it reflect high leverage best practices?
- Is it accessible for ALL students?
- Does it lead to students being able to demonstrate mastery of the standard?

Notes:

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Potential Gaps in Materials

Grades K–2:

- Increased fluency standards
    - Expanded range of numbers in K–2
- Money standards included in K–1

Grades 3–5:

- Measurement and data conversion standard revised and shifted
    - Conversion limited to same system and from larger to smaller units exclusively in grade 5

Notes:

Module 8 Review

The review process of instructional materials will:

- Deepen understanding of the standards,
- Make use of review instruments to analyze materials to determine alignment or gaps, and
- Result in wise decisions about how best to use the materials already on-site to teach the new standards to mastery OR effectively fill any gaps uncovered in the review process.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Appointment with Peers

Please meet with your fourth partner to discuss the following:

- How can the materials review instrument lead to improved student outcomes in your classroom?

Notes:

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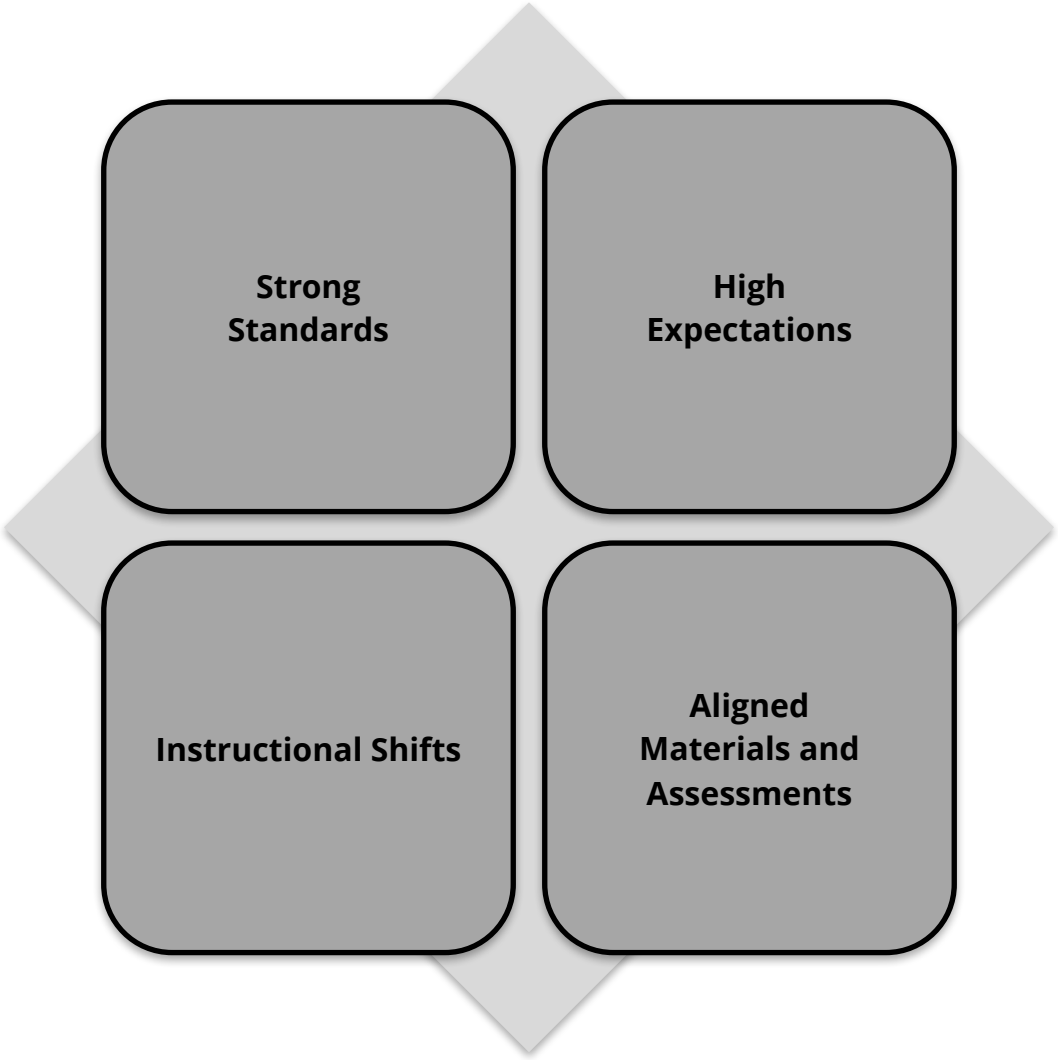
TAB PAGE

Part 5: Putting It All Together

Module 9: Instructional Planning



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Goals

- Understand intentional instruction as a bridge between strong standards and assessment.
- Develop lesson planning techniques to strengthen the understanding of the relationship between standards and practice.
- Create lessons based on the revised standards to be used for instruction.

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Instructional Shifts

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessments

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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Designing Effective Learning Experiences

"...teachers have a responsibility to make day-to-day instructional choices that ensure that students work with problems that engage their interest and their intellect."

—Cathy L. Seeley, 2014

Notes:

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What is Intentional Instruction?

What does “intentional” mean?

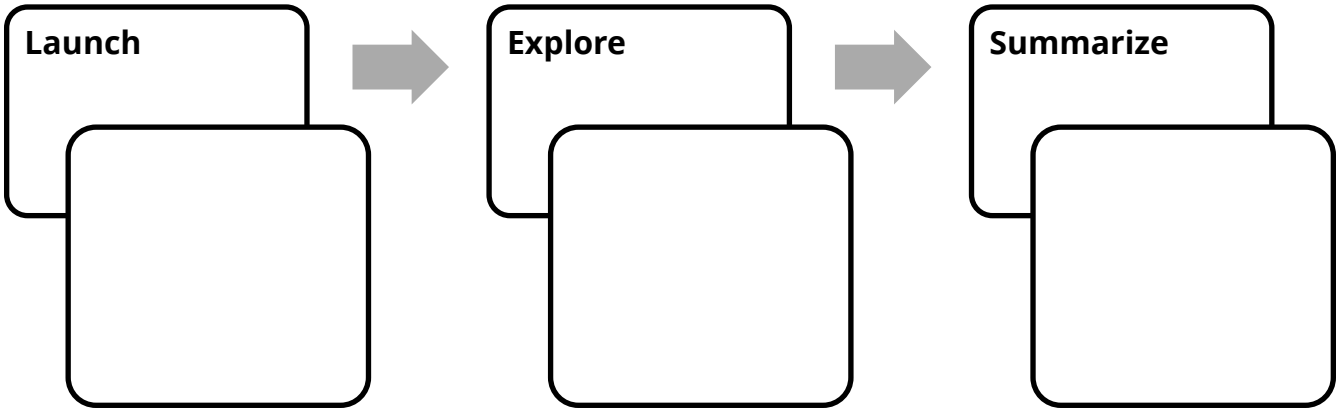
Keep standards in mind – what standards are driving your instruction?

Keep assessment in mind – what are your end goals? What do students need to…

Know,

Understand, and

Do to meet these standards?



Notes:

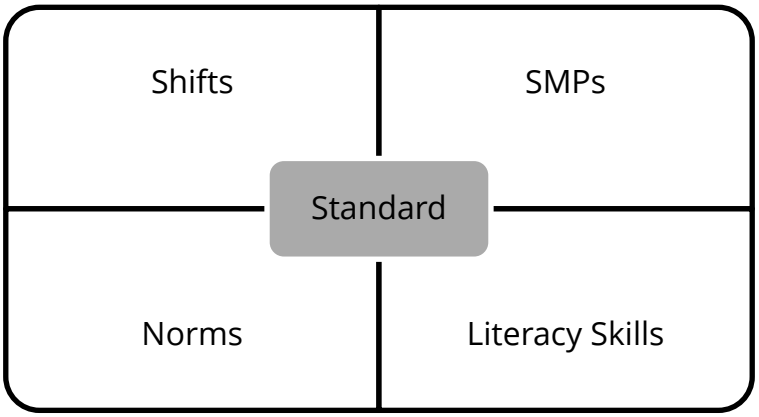
Putting it all Together

- Review standard, determine KUD
- Evaluate instructional materials
- Utilize Launch, Explore, and Summarize model
- Assess learning

Step 1: Review the Standards

Review the revision of standard

- Is the standard the same or has it been revised?
- Has the learning changed?
- How do the SMPs, literacy skills, and instructional shifts apply?
- What do students need to know, understand, and do?



Notes:

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Step 2: Evaluate Instructional Materials

- Use the materials review instrument.
- Evaluate textbook and supplemental materials for alignment.

Step 3: Create Learning Experiences

- Plan with the *end in mind.*
- What will the teacher be doing?
- What will the students be doing?
- What will the classroom look and sound like?
- What literacy skills and mathematical practices will be incorporated?

Step 4: Assessment

- How will you know they have learned the concepts?
- Can you challenge students' thinking during an assessment?
- How do you provide intervention for a specific student after instruction?

Notes:

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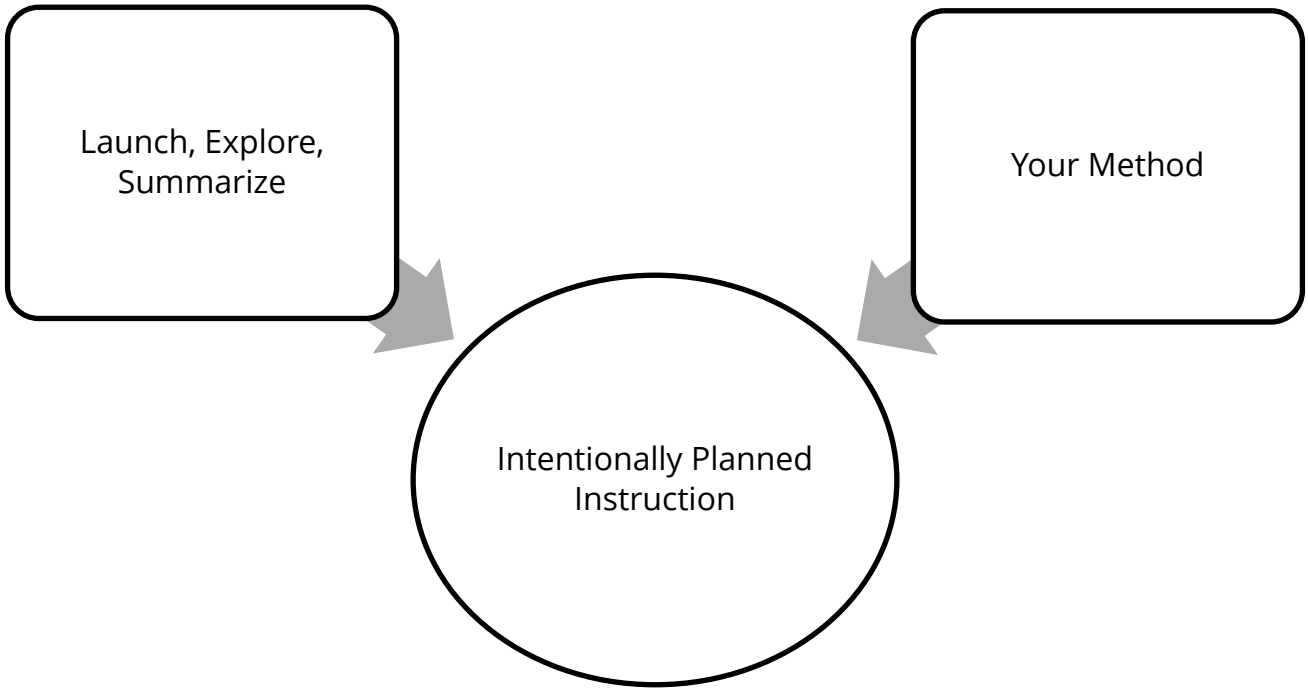
Designing Effective Learning Experiences
Putting It All Together

Now it's your turn! Use this space for your small group planning.



Launch, Explore, Summarize is only one method you can use to intentionally plan instruction.

Module 9 Recap

- Younger children have little or no means of computing. Thus, counters or other models are used to reenact the problem.
- No matter the grade level, have children think through the problem before they get started.
- Solving contextual problems of all sorts on a regular basis should be a significant part of your number and computation curriculum.
- Your goals for children should go beyond being able to solve story problems.

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Module 9 Review

- There are many ways to “do” intentional instruction.
- Intentional instruction is the bridge between standards and assessment.
- Start with the standard: determine what students need to know, understand, and do.
- Create learning experiences that connect to students’ experiences and give them a chance to explore the concept.
- Assessment plays a critical role in instruction, should be standards based, and should be used to determine student mastery of the standard(s).

Strong Standards

Standards are the bricks that should be masterfully laid through quality instruction to ensure that all students reach the expectation of the standards.

High Expectations

We have a continued goal to prepare students to be college and career ready.

Shifts in Instructional Practice

The instructional shifts are an essential component of the standards and provide guidance for how the standards should be taught and implemented.

Aligned Materials and Assessment

Educators play a key role in ensuring that our standards, classroom instructional materials, and assessments are aligned.

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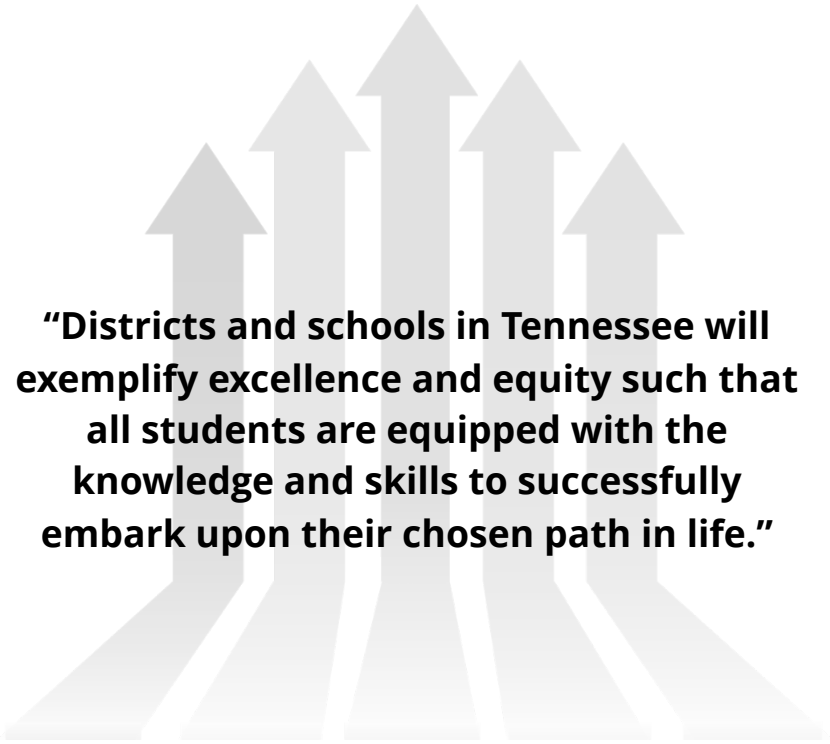

“Districts and schools in Tennessee will exemplify excellence and equity such that all students are equipped with the knowledge and skills to successfully embark upon their chosen path in life.”

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