TNReady Grades 3–5 Mathematics

2017–18 School Year

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Please note: *Some resource publishers have created materials that contain "TNReady" in the title or within the contents of their instructional materials.* ***The department does not endorse any of these materials as official TNReady products.***

This document provides information about the design of TNReady assessments. It is not intended to be used solely as an instructional resource or as a pacing guide. Districts should consult the Tennessee academic standards when making all instructional decisions, including scope and sequence. The Tennessee academic standards can be found here.

Overview of Grades 3–5 Mathematics Testing Structure

As in the past, each year the state assessment includes both operational and field test items. The testing structure outlined below reflects both the number of operational assessment items and the number of field test items.

For scheduling purposes, subparts can be combined.

Subpart 1* (No Calculator)	Subpart 2 (Calculator)	Subpart 3 (Calculator)
• 45 Minutes • 21–31 Items	• 30 Minutes • 10–17 Items	• 40 Minutes • 12–17 Items

For scheduling purposes, subparts can be combined.

*For the TNReady mathematics assessments, subpart 1 is designed to measure number sense, conceptual understanding, and fluency. Fluency is the result of a process involving the interplay of practice and reasoning over time as opposed to the notion of memorizing facts devoid of meaning. Fluency is a focus on calculating in a manner that is accurate, flexible, and efficient. Subpart I of TNReady is taken without a calculator for this very reason. As a state, we are measuring how efficiently students work with mathematics. In order to be successful, students need to be equipped with a deep, conceptual understanding of Tennessee's grade-level standards, strong number sense, and strategies that allow them to work mathematics fluently. It is not the expectation that all students will finish subpart I. It is the expectation that students who have a comprehensive understanding of their grade level standards and thorough ability to demonstrate fluency, number sense, and true conceptual understanding be able to complete the subpart in the allotted time.

TN Department of Education

Grades 3–5 Mathematics Blueprints

The blueprints below reflect only operational assessment items. You can find the grades 3–5 mathematics standards here.

In grades 3–8 mathematics, approximately 70 percent of the assessment items gauge student mastery on major work of the grade. Approximately 30 percent of the items gauge student mastery on supporting and additional work.

Grade 3			
	# of Items	**# of Score Points**	**% of Test**
Computation with Whole Numbers • **3.OA.A-Represent and solve problems involving multiplication and division. • **3.OA.C-Multiply and divide within 100. • 3.NBT.A-Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)	10–14	12–16	22–29
Fractions • **3.NF.A-Develop understanding of fractions as numbers.	4–6	5–8	9–15
Number Relationships and Patterns • **3.OA.B-Understand properties of multiplication and the relationship between multiplication and division. • **3.OA.D-Solve problems involving the four operations, and identify and explain patterns in arithmetic.	7–10	8–12	15–22
Geometric and Measurement Concepts • 3.G.A-Reason with shapes and their attributes. • **3.MD.A-Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. • 3.MD.B-Represent and interpret data. • **3.MD.C-Geometric measurement: understand and apply concepts of area and relate area to multiplication and to addition. • 3.MD.D-Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	13–20	18–22	33–40
Problem Solving	1	4–6	7–11
Total	35–51	*50–60	100

**Math assessments must have a minimum of 50 score points.*

***Clusters with asterisks indicate major content of the grade.*

Grade 4			
	# of Items	**# of Score Points**	**% of Test**
Computation with Whole Numbers • **4.NBT.B-Use place value understanding and properties of operations to perform multi-digit arithmetic. • **4.OA.A-Use the four operations with whole numbers to solve problems.	9–12	10–14	18–25
Fractions • **4.NF.A-Extend understanding of fraction equivalence and comparison. • **4.NF.B-Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. • **4.NF.C-Understand decimal notation for fractions, and compare decimal fractions.	12–17	15–19	27–35
Number Relationships and Patterns • 4.OA.B-Gain familiarity with factors and multiples. • 4.OA.C-Generate and analyze patterns. • **4.NBT.A-Generalize place value understanding for multi-digit whole numbers.	8–12	10–14	18–25
Geometric and Measurement Concepts • 4.MD.A-Estimate and solve problems involving measurement. • 4.MD.B-Represent and interpret data. • 4.MD.C-Geometric measurement: understand concepts of angles and measure angles. • 4.G.A-Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	7–9	7–11	13–20
Problem Solving	1	4–6	7–11
Total	37–51	*50–60	100

**Math assessments must have a minimum of 50 score points.*

***Clusters with asterisks indicate major content of the grade.*

Grade 5			
	# of Items	**# of Score Points**	**% of Test**
Computation with Whole Numbers and Decimals; Evaluating Expressions • 5.OA.A-Write and interpret numerical expressions. • **5.NBT.B-Perform operations with multi-digit whole numbers and with decimals to hundredths.	7–9	7–11	13–20
Fractions • **5.NF.A-Use equivalent fractions as a strategy to add and subtract fractions. • **5.NF.B-Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	11–15	13–17	24–31
Number Relationships and Patterns • 5.OA.B-Analyze patterns and relationships. • **5.NBT.A-Understand the place value system.	7–9	7–11	13–20
Geometric and Measurement Concepts • 5.MD.A-Convert like measurement units within a given measurement system from a larger unit to a smaller unit. • 5.MD.B-Represent and interpret data. • **5.MD.C-Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. • 5.G.A-Graph points on the coordinate plane to solve real-world and mathematical problems. • 5.G.B-Classify two-dimensional figures into categories based on their properties.	12–17	15–19	27–35
Problem Solving	1	4–6	7–11
Total	38–51	*50–60	100

**Math assessments must have a minimum of 50 score points.*

***Clusters with asterisks indicate major content of the grade.*

TNReady Grades 3–5 Mathematics Calculator Policy

Central Beliefs

The TNReady Calculator Policy is based on two central beliefs:

1. Calculators are important tools and, in order to be ready for career and college, students need to understand how to use calculators effectively.
2. In order to demonstrate mastery of the mathematics standards, students must demonstrate many skills without reliance on calculators.

Therefore, at all grade levels and in all courses, the math assessment will include both calculator-permitted subparts and calculator-prohibited subparts.

- There will be one calculator-prohibited subpart and two calculator-permitted subparts at all grade levels.
- Information on the types of questions on the calculator-prohibited section of TNReady can be found here.

Rationale

Calculator functionalities should align with the mathematics in each grade band. In grades 3–5 mathematics, our state standards focus on **solidifying** a student's computational fluency with whole numbers. Students are also **developing** an understanding of fractions and beginning the process of developing computational fluency with fractions. Students should not have calculator functionalities available to them for concepts that are in the developmental stage.

As stated within our central beliefs, students should have the opportunity to interact with technology and the opportunity to demonstrate critical thinking and problem solving with the aid of a calculator. However, in order to provide an equitable assessment experience for all Tennessee students, the type of calculator used by students should be consistent in functionality. As fractional understanding is in the developmental phase over this grade band, students do not need a fraction key—they need to be able to demonstrate their conceptual understanding of fractions and operations with fractions. Thus, third through fifth grade students will be allowed a four-function calculator, which does not include any of the prohibited functionalities, on the calculator-permitted subparts, such as fractions.

Test Administration Guidelines

- It is the responsibility of the test administrator to ensure the regulations outlined in this policy pertaining to calculator use are followed.
- All memory and user-entered programs and documents must be cleared or removed before and after the test.
- A student may use any grade band-specific permitted calculator on the calculator-permitted subparts.

- Students should have access to no more than one handheld calculator device for calculator-permitted subparts.
- As we transition to online in future years, students will have access to practice with the same calculator functionalities that will be available on the operational assessment on both the item sampler and the practice tests.

Handheld Calculator Types

For grades 3–5, students may use any four-function calculator, which does not include any of the prohibited functionalities. *Please note: this is not an exhaustive list of calculator types, and students should be familiar with particular functions at the appropriate grade level.*

Examples of <u>permitted</u> calculators:

- Casio HS 4 Basic
- Sharp ELSI Mate EL-2405A
- TI-108

Examples of <u>permitted</u> functionalities:

- Addition
- Subtraction
- Multiplication
- Division
- Square root ($\sqrt{x}$)
- %

Examples of <u>prohibited</u> calculators:

- Casio CFX-9970
- Casio FX260
- HP-40G
- Sharp EL344RB
- TI-15
- TI-30XA
- TI-30IIS
- TI-34
- TI-84 plus family
- TI-89
- TI-NSpire (non-CAS) and TI-NSpire-CX (non-CAS)
- TI-NSpire (CAS version)

Examples of <u>prohibited</u> functionalities:

- Fraction manipulation
- Fraction to decimal conversions/decimal to fraction conversions
- Square key (x^2 or x^y)
- Pi (π)
- Graphing capability
- Data entry
- Matrices
- Regression
- Trigonometric functions (sine, cosine, tangent)
- Logarithm (log and/or ln) and exponential functions (a^x and/or e^x)
- Any calculator with CAS (computer algebra system) capabilities (including any programs or applications)
- Wireless communication capability
- QWERTY keyboard
- Cell phones, tablets, iPads, etc.

Grade 5 Mathematics Reference Sheet

The math assessment will allow reference sheets for all students in **grades five through high school.** The reference sheets are designed to match the intent of our current state standards in math. The language of the standards in grades 3 and 4 does not necessitate a reference sheet.

TNReady Math Reference Sheet—Grade 5
1 yard = 3 feet 1 mile = 1760 yards 1 mile = 5280 feet 1 kilometer = 1000 meters 1 pound = 16 ounces 1 ton = 2000 pounds 1 kilogram = 1000 grams 1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 liter = 1000 milliliters

TNReady Grades 3–5 Mathematics Item Types

This provides descriptions of TNReady item types for the 2017–18 school year. For further information about test structure, please refer to the assessment blueprints. For sample items, please see the practice tests posted to EdTools.

Multiple choice: These are items with four answer options, only one of which is correct.

Multiple select: These are items with more than four answer choices with multiple correct responses. In grades 3–5, sometimes the number of correct responses will be indicated (e.g., "choose the two correct answers"), but sometimes the number of correct responses will not be indicated (e.g., "select all of the correct answers"). These are item dependent and based on the standard.

Fill in the blank: Students must provide their mathematical solution to a problem. No written explanation is required. These are currently hand scored.

Integrated items: These are multipart, 4–6-point questions that ask students to assimilate information from multiple grade-level domains. They may require background knowledge from previous grades.

Two-part items: These are items with two parts, A and B, worth a total of two points. These are scored in two different ways depending on their type.

> **Type 1:** The two parts of these items work independently of one another, and they are scored independently. Students can get one point for getting only part A correct, one point for only getting part B correct, or two points for getting both parts A and B correct.
>
> **Type 2:** The two parts of these items are dependent on one another. These occur when students must use their answer from part A to create their answer for Part B. If a student misses part A but uses their answer correctly to solve part B, they would get one point for their part B answer.

Graphing: Students will be asked to provide a graphical representation. These may be on a number line or on a coordinate plane. All graphing items are currently hand scored.

Matching table: These items are tables where students are asked to match what appears on each row of a table with a correct response located in the columns of the table.