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# GRADE 2 • MODULE 3

## Place Value, Counting, and Comparison of Numbers to 1,000



**NOTE: Student sheets should be printed at 100% scale to preserve the intended size of figures for accurate measurements. Adjust copier or printer settings to *actual size*, and set page scaling to *none*.**

Grade 2 • Module 3

# Place Value, Counting, and Comparison of Numbers to 1,000

## OVERVIEW

In Module 2, students added and subtracted measurement units within 100 (**2.MD.5**, **2.MD.6**), a meaningful application of their work from Module 1 (**2.NBT.5**) and a powerful bridge to the base ten units of Grade 2.

In this 25-day Grade 2 module, students expand their skill with and understanding of units by bundling ones, tens, and hundreds up to a thousand with straws. Unlike the length of 10 centimeters in Module 2, these bundles are discrete sets. One unit can be grabbed and counted just like a banana—1 hundred, 2 hundred, 3 hundred, etc. (**2.NBT.1**). A number in Grade 1 generally consisted of two different units, tens and ones. Now, in Grade 2, a number generally consists of three units: hundreds, tens, and ones (**2.NBT.1**). The bundled units are organized by separating them largest to smallest, ordered from left to right. Over the course of the module, instruction moves from physical bundles that show the proportionality of the units to non-proportional place value disks and to numerals on the place value chart (**2.NBT.3**).

Furthermore, in this module instruction includes a great deal of counting: by ones, tens, and hundreds (**2.NBT.2**). Counting up using the centimeter tape or a classroom number line shows movement from left to right as the numbers increase. Counting up on the place value chart shows movement from right to left as the numbers increase. For example, as 10 ones are renamed as 1 ten, the larger unit is housed in the place directly to the left. The goal is for students to move back and forth fluidly between these two models, the number line and the place value chart, using them to either to rename units and compare numbers (**2.NBT.4**).

In this module, the place value story has advanced. Along with changing 10 ones for 1 ten, students now also change 10 tens for 1 hundred. This changing leads to the use of counting strategies to solve word problems (**2.OA.1**). In the next module, this change leads to mental math and the formal algorithms for addition and subtraction. Comparison extends into finding 100 more and 100 less, 10 more and 10 less, etc. Just as in Grade 1, *more* and *less* translate into formal addition and subtraction at the onset of Module 4 (**2.NBT.8**).

How is this module's learning foundational to later grades? Understanding 3 tens or 3 units of 10 leads to an understanding of 3 fours or 3 units or groups of four (Grade 3 OA standards), 3 fourths or 3 units of one-fourth (Grade 3 NF standards). Learning that 12 tens = 120 leads to an understanding of 12 tenths = 1.2, 4 thirds = 4/3 = 1 1/3, or even 4 threes = 12. Counting up and down by ones, tens, and hundreds with both the number line and place value chart is essential from Grade 3 forward for rounding and mental math (Grade 3 NBT standards) to meaningful understanding of all operations with base ten whole numbers (Grade 4 NBT standards) and to understanding place value's extension into decimal fractions and operations (Grade 5 NBT standards).

## Notes on Pacing for Differentiation

If pacing is a challenge, consider the following modifications and omissions. Omit the Application Problem in Lesson 7 in order to give more time to practice the multiple segments in the Concept Development.

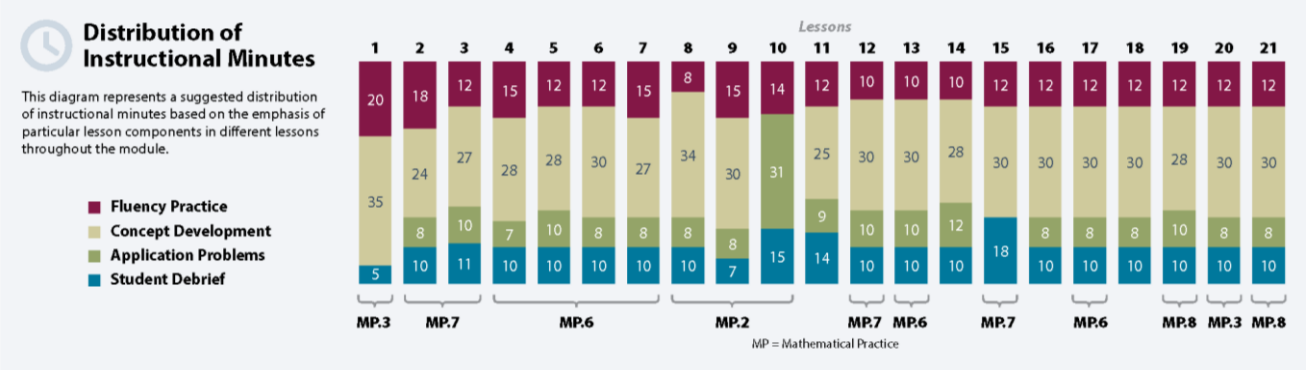
Reduce the Concept Development of Lesson 9 by omitting the empty number line. Instead, have students draw the bills used to count up from one amount to the next as was done in Lesson 3 but with bundles. If the empty number line is omitted in Lesson 9, then the component following the Problem Set of Lesson 13, "Estimating Numbers on the Empty Number Line," should also be omitted along with related questions from the Debrief and Problem 2 of the Exit Ticket. Consider using the empty number line as an extension.

Omit Lesson 10, and use it instead as an extension for early finishers or as a center activity during a different time of day (e.g., RTI time, economics, morning work, or problem of the week).

Reduce Lesson 11 by omitting the use of Dienes blocks in the Concept Development. Distribute bills instead. Omit the discussion about the difference between modeling with the blocks and the bills. Have students only model with bills and place value disks in the Problem Set.

Omit, or move to morning work, the Application Problems in Lessons 12 and 14 to allow more time for the Concept Developments. Consolidate Lessons 17 and 18, or perhaps use Lesson 18 as an activity for centers to allow students continued practice comparing numbers when represented in different forms.

Consider using Lesson 21 as either a center activity or morning work.



# Focus Grade Level Standards

**Understand place value.**

**2.NBT.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens—called a "hundred."

b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

**2.NBT.2** Count within 1000; skip-count by 5s[1], 10s, and 100s.

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

**2.NBT.4** Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

# Foundational Standards

**1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones—called a "ten."

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

**1.NBT.3** Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

# Focus Standards for Mathematical Practice

**MP.2** **Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*—to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the 6 units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects (exemplified in Topic D).

[1] Use an analog clock to provide a context for skip-counting by fives.

**MP.3** **Construct viable arguments and critique the reasoning of others.** Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the argument (exemplified in Topics A and E).

**MP.6** **Attend to precision.** Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school, they have learned to examine claims and make explicit use of definitions (exemplified in Topics C and F).

**MP.7** **Look for and make use of structure.** Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see $7 \times 8$ equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as $2 \times 7$ and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers $x$ and $y$ (exemplified in Topic B).

**MP.8** **Look for and express regularity in repeated reasoning.** Mathematically proficient students notice if calculations are repeated and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)$

$(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results (exemplified in Topic G).

## Overview of Module Topics and Lesson Objectives

| Standards | Topics and Objectives | | Days |
|---|---|---|---|
| **2.NBT.1** | A | **Forming Base Ten Units of Ten, a Hundred, and a Thousand**<br>Lesson 1: Bundle and count ones, tens, and hundreds to 1,000. | 1 |
| **2.NBT.2**[2]<br>2.NBT.1 | B | **Understanding Place Value Units of One, Ten, and a Hundred**<br>Lesson 2: Count up and down between 100 and 220 using ones and tens.<br>Lesson 3: Count up and down between 90 and 1,000 using ones, tens, and hundreds. | 2 |
| **2.NBT.3**<br>2.NBT.1<br>2.NBT.2 | C | **Three-Digit Numbers in Unit, Standard, Expanded, and Word Forms**<br>Lesson 4: Count up to 1,000 on the place value chart.<br>Lesson 5: Write base ten three-digit numbers in unit form; show the value of each digit.<br>Lesson 6: Write base ten numbers in expanded form.<br>Lesson 7: Write, read, and relate base ten numbers in all forms. | 4 |
| **2.NBT.2**<br>2.NBT.1<br>2.NBT.3<br>2.MD.8 | D | **Modeling Base Ten Numbers Within 1,000 with Money**<br>Lesson 8: Count the total value of \$1, \$10, and \$100 bills up to \$1,000.<br>Lesson 9: Count from \$10 to \$1,000 on the place value chart and the empty number line.<br>Lesson 10: Explore \$1,000. How many \$10 bills can we change for a thousand dollar bill? | 3 |
| | | Mid-Module Assessment: Topics A–D (assessment ½ day, return ½ day, remediation or further applications 1 day) | 2 |

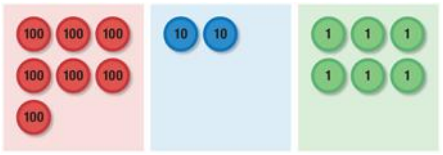
[2]Use analog clock to provide a context for skip-counting by fives.

| Standards | | Topics and Objectives | Days |
|---|---|---|---|
| **2.NBT.A** | E | **Modeling Numbers Within 1,000 with Place Value Disks**<br>Lesson 11: Count the total value of ones, tens, and hundreds with place value disks.<br>Lesson 12: Change 10 ones for 1 ten, 10 tens for 1 hundred, and 10 hundreds for 1 thousand.<br>Lesson 13: Read and write numbers within 1,000 after modeling with place value disks.<br>Lesson 14: Model numbers with more than 9 ones or 9 tens; write in expanded, unit, standard, and word forms.<br>Lesson 15: Explore a situation with more than 9 groups of ten. | 5 |
| **2.NBT.4** | F | **Comparing Two Three-Digit Numbers**<br>Lesson 16: Compare two three-digit numbers using <, >, and =.<br>Lesson 17: Compare two three-digit numbers using <, >, and = when there are more than 9 ones or 9 tens.<br>Lesson 18: Order numbers in different forms. (Optional) | 3 |
| **2.NBT.2**<br>2.OA.1<br>2.NBT.8 | G | **Finding 1, 10, and 100 More or Less than a Number**<br>Lesson 19: Model and use language to tell about 1 more and 1 less, 10 more and 10 less, and 100 more and 100 less.<br>Lesson 20: Model 1 more and 1 less, 10 more and 10 less, and 100 more and 100 less when changing the hundreds place.<br>Lesson 21: Complete a pattern counting up and down. | 3 |
| | | End-of-Module Assessment: Topics A–G (assessment ½ day, return ½ day, remediation or further applications 1 day) | 2 |
| **Total Number of Instructional Days** | | | **25** |

# Terminology

## New or Recently Introduced Terms

- Base ten numerals (e.g., a thousand is 10 hundreds, a hundred is 10 tens, starting in Grade 3 a one is 10 tenths, etc.)
- Expanded form (e.g., 500 + 70 + 6)
- Hundreds place (e.g., the 5 in 576 is in the hundreds place)
- One thousand (1,000)
- Place value or number disk (pictured)
- Standard form (e.g., 576)
- Unit form (e.g., 5 hundreds 7 tens 6 ones)
- Word form (e.g., five hundred seventy-six)




Unit form modeled with place value disks:
7 hundreds 2 tens 6 ones = 72 tens 6 ones

## Familiar Terms and Symbols[3]

- =, <, > (equal, less than, greater than)
- Altogether (e.g., 59 centimeters and 17 centimeters; altogether there are 76 centimeters)
- Bundling, grouping (putting smaller units together to make a larger one, e.g., putting 10 ones together to make a ten or 10 tens together to make a hundred)
- How many more/less (the difference between quantities)
- How much more/less (the difference between quantities)
- More than/less than (e.g., 576 is more than 76; 76 is less than 576)
- Number sentence (an equation or inequality that has a true or false value and contains no unknowns, e.g., 3 + 2 = 5)
- Ones place (e.g., the 6 in 576 is in the ones place)
- Place value (the unitary values of the digits in numbers)
- Renaming, changing (instead of *carrying* or *borrowing,* e.g., a group of 10 ones is renamed a ten when the ones are bundled and moved from the ones to the tens place; if using $1 bills, they may be changed for a $10 bill when there are enough)
- Tens place (e.g., the 7 in 576 is in the tens place)
- Units of ones, tens, hundreds, one thousand (a single one and groups of 10s, 100s, and 1,000)

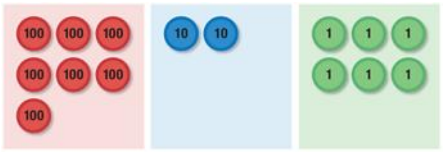
[3]These are terms and symbols students have seen previously.

## Suggested Tools and Representations

- 2 boxes of 1,000 straws per class of 25
- Clock number line (details in Lesson 1 Fluency Practice)
- Dice, 1 per pair
- Dienes blocks
- Hide Zero cards (also known as place value cards) showing numbers 1–5, 10–50, and 100—500 (1 small set per student) (Lesson 4 Template 1))
- Hundreds place value chart (Lesson 4 Template 2)
- Meter strip (Lesson 1 Template)
- Number spelling activity sheet (Lesson 7 Activity Sheet)
- Personal white boards
- Place value box (details in Lesson 4 Concept Development)
- Place value cards to 1,000, 1 large teacher set
- Place value disks: suggested minimum of one set per pair (18 ones, 18 tens, 18 hundreds, and 1 one thousand)
- Play money: $1, $5, $10, and $100 bills (10 ones, 1 five, 12 tens, and 10 hundreds per pair), and a single set of 16 pennies, 13 dimes
- Rubber bands, 16 per pair
- Small plastic bags (small resealable bags)

| hundreds | tens | ones |
|---|---|---|
| | | |

Hundreds Place Value Chart




Place Value Disks

| | | |
|---|---|---|
| | | |

Unlabeled Hundreds Place Value Chart
(use with number disks)

## Scaffolds[4]

The scaffolds integrated into *A Story of Units* give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population. To read more about the approach to differentiated instruction in *A Story of Units,* please refer to "How to Implement *A Story of Units*."

[4]Students with disabilities may require Braille, large print, audio, or special digital files. Please visit the website www.p12.nysed.gov/specialed/aim for specific information on how to obtain student materials that satisfy the National Instructional Materials Accessibility Standard (NIMAS) format.

## Assessment Summary

| Type | Administered | Format | Standards Addressed |
|---|---|---|---|
| Mid-Module Assessment Task | After Topic D | Constructed response with rubric | 2.NBT.1<br>2.NBT.2<br>2.NBT.3 |
| End-of-Module Assessment Task | After Topic G | Constructed response with rubric | 2.NBT.1<br>2.NBT.2<br>2.NBT.3<br>2.NBT.4 |