

# Winchester Math Curriculum Grade 4

<b>Subject</b>	Mathematics
<b>Grade/Course</b>	Grade Four
<b>Unit of Study</b>	Unit 4: Addition, Subtraction, & Measurement
<b>Pacing</b>	January
<b>Unit Summary</b>	In this unit, students study addition, subtraction, and measurement concepts. As part of their work, students investigate and use the standard addition and subtraction algorithms. They compare the use of algorithms to other methods and make generalizations about which work best for certain problems. In Module 3, students explore length and distance, liquid volume, time, mass, and weight. They investigate the relationships between common measures, and they solve problems that require them to convert measurements to smaller units within the same system of measure.
<b><u>Overarching Mathematical Practices</u></b>	
<p>4.MP.1 Make sense and persevere in solving problems.</p> <p>4.MP.2 Reason abstractly and quantitatively.</p> <p><b>4.MP.3 Construct viable arguments and critique the reasoning of others.</b></p> <p>4.MP.4 Model with mathematics.</p> <p>4.MP.5 Use appropriate tools strategically.</p> <p><b>4.MP.6 Attend to precision.</b></p> <p>4.MP.7 Look for and make use of structure.</p> <p><b>4.MP.8 Look for and express regularity in repeated reasoning.</b></p>	
<b><u>Unit CT Core Content Standards</u></b>	
<p><u>4.OA.A.3</u> 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.</p> <p><u>4.NBT.A.1</u> 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.</p> <p><b><u>4.NBT.A.2</u></b> <b>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 &gt;, =, and &lt; symbols to record the results of comparisons.</b></p> <p><b><u>4.NBT.A.3</u></b> <b>Use place value understanding to round multi-digit whole numbers to any place.</b></p> <p><b><u>4.NBT.B.4</u></b></p>	

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**Fluently add and subtract multi-digit whole numbers using the standard algorithm.**

**4.MD.A.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.

**4.MD.A.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.B.4**

Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

**“Unwrapped” Standards**

<b>Skills</b>	<b>Content</b>
Multiply or Divide	to solve word problems involving multiplicative comparison (distinguishing multiplicative comparison from additive comparison)
Solve	<ul style="list-style-type: none"> <li>multi-step word problems posed with whole numbers and having whole number answers using four operation</li> <li>problems with addition and subtraction of fractions</li> </ul>
Interpret	remainders
Represent	<ul style="list-style-type: none"> <li>problems with equations with a letter standing for the unknown</li> <li>measurement quantities using diagrams with a measurement scale</li> </ul>
Assess	the reasonableness of answers
Recognize	in a multi-digit number, a digit in one place represents ten times what it represents in the place to its right.
Read and Write	multi-digit whole numbers using numerals, number names, and expanded form
Compare	two multi-digit numbers
Record	<ul style="list-style-type: none"> <li>comparisons using symbols <math>&lt;</math>, <math>=</math>, <math>&gt;</math></li> <li>measurement equivalents in a table</li> </ul>
Use	<ul style="list-style-type: none"> <li>place value understanding to round</li> <li>four operations to solve problems involving distance, time, liquid volume, mass, and money</li> </ul>

Fluently add and subtract	multi-digit whole numbers using the standard algorithm
Know	relative sizes of measurement units within one system
Express	measurements in a larger unit in terms of a smaller unit
Make	a line plot to display measurement data

Essential Questions	Big Ideas
<ol style="list-style-type: none"> <li>1. What is the purpose of measurement?</li> <li>2. How can we use measurements to solve real world problems?</li> <li>3. How can analyzing operations on numbers and the results help us to become more efficient at computation?</li> </ol>	<ol style="list-style-type: none"> <li>1. Measurement is used to describe, compare, precisely explain, and solve problems in the world.</li> <li>2. Objects have attributes that can be measured in many ways. The measurements can be combined and/or broken down into parts to solve problems.</li> <li>3. Analyzing problems and their answers can help us to see patterns that can lead to greater number sense and a deeper understanding of the reasonableness of our answers and shortcuts and standard algorithms for efficient computation.</li> </ol>

**Evidence of Learning - Assessment**

	Interim Assessment	Additional Evidence of Learning
<ul style="list-style-type: none"> <li>● Unit 4 Pre-Assessment - Module 1, Session 1</li> <li>● Unit 4 Post-Assessment - Module 4, Session 3</li> <li>● Number Corner Checkup 2</li> </ul>	<ul style="list-style-type: none"> <li>● Addition Strategies Work Sample - M1, S6</li> <li>● Place Value and Addition Checkpoint - M1, S7</li> <li>● Subtraction Strategies Work Samples - M2, S4</li> <li>● Subtraction Checkpoint - M3, S1</li> </ul>	<p>Options</p> <ul style="list-style-type: none"> <li>● <a href="#">Exit tickets</a></li> </ul> <p>Observational Assessments</p> <ul style="list-style-type: none"> <li>● Target One Thousand - M1, S1</li> <li>● Add, Round, and Compare - M1, S4</li> <li>● Roll and Subtract One Thousand - M2, S5</li> <li>● Target Five - M3, S2</li> </ul>

**Smarter Balanced Interim Assessment**

[Smarter Balanced General Scoring Rubrics](#) - 4 Rubrics included - Score Pt 4 to Score Pt 1

**Smarter Balanced Interim Blocks**

- Interim assessment blocks may be used for a variety of assessment purposes, including: pre/post, interim and formative (additional evidence of learning).
- The [Style Guide](#), which aligns with the expectations of Smarter Balanced Assessments, will support the creation of unit- and standard-aligned items for instructional use.

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· The items on the interim assessments are developed under the same conditions, protocols, and review procedures as those used in the summative assessments. Therefore, they assess the same Common Core State Standards, adhere to the same principles of Universal Design in order to be accessible to all students, and provide evidence to support Smarter Balanced claims in mathematics and ELA/literacy. The interim assessment items are non-secure but non-public. This means that educators may view the items, however, they should not be made public outside of classroom, school or district.

**Unit-aligned Smarter Balanced Interim Assessment Block (IAB)\*:**

Interim Assessment Block - access through [CSDE Assessment Portal](#)

- IAB - Performance Task - Animal Jumping

· *\*Some interim blocks show clear, strong alignment to priority standards within the unit. Other blocks have been placed in one specific unit but could be aligned to the priority standards of several units. Blocks have been spread out over the course of all units for a more balanced approach to assessment throughout the school year. These interim blocks, used in partnership with the Style Guide, will support the creation of unit- and standard-aligned items for instructional use.*

## Learning Plan

### Researched-based Instructional Resources and Methods

**Sequence of Instruction:**

**Number Corner → Problem + Investigations → Work Places → Math Forum\* → Daily Practice or Home Connection**

Bridges Number Corner - The focus areas of Number Corner Aligned to Unit 4 are:

**Geometry**

- Explore, discuss, and analyze congruence, lines of symmetry, parallel and perpendicular lines
- Rotating and flipping figures
- Draw, analyze, sort, and classify figures

**Computation**

- Add and subtract multi-digit numbers
- Add and subtract with standard algorithm
- Regrouping with standard algorithm
- Multi-digit subtraction strategies for subtraction problems

**Measurement**

- Logical reasoning to determine dimensions and position

**Multiplication**

- Add multiples of 7 and 9 on the number line
- Use multiples of 10 as landmarks
- Practice multiplication and division facts and factoring

Bridges - Whole Group, Small Group and Independent Problem Centered Activities

Module 1	Module 2	Module 3	Module 4
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Problem + Investigation <ul style="list-style-type: none"> <li>● Sessions 2-7</li> </ul> Problem String <ul style="list-style-type: none"> <li>● Session 4</li> </ul> Work Place <ul style="list-style-type: none"> <li>● Sessions 1, 2, 4, 7</li> </ul> Math Forum <ul style="list-style-type: none"> <li>● None</li> </ul> Daily Practice <ul style="list-style-type: none"> <li>● Sessions 1-7</li> </ul> Home Connection <ul style="list-style-type: none"> <li>● Sessions 2, 4, 6</li> </ul>	Problem + Investigation <ul style="list-style-type: none"> <li>● Sessions 1-5</li> </ul> Problem String <ul style="list-style-type: none"> <li>● None</li> </ul> Work Place <ul style="list-style-type: none"> <li>● Sessions 2, 5</li> </ul> Math Forum <ul style="list-style-type: none"> <li>● Session 2</li> </ul> Daily Practice <ul style="list-style-type: none"> <li>● Sessions 1-5</li> </ul> Home Connection <ul style="list-style-type: none"> <li>● Sessions 1, 3, 5</li> </ul>	Problem + Investigation <ul style="list-style-type: none"> <li>● Sessions 1-5</li> </ul> Problem String <ul style="list-style-type: none"> <li>● None</li> </ul> Work Place <ul style="list-style-type: none"> <li>● Sessions 2, 4, 5</li> </ul> Math Forum <ul style="list-style-type: none"> <li>● None</li> </ul> Daily Practice <ul style="list-style-type: none"> <li>● Sessions 1-5</li> </ul> Home Connection <ul style="list-style-type: none"> <li>● Sessions 2, 4</li> </ul>	Problem + Investigation <ul style="list-style-type: none"> <li>● Sessions 1-3</li> </ul> Problem String <ul style="list-style-type: none"> <li>● None</li> </ul> Work Place <ul style="list-style-type: none"> <li>● Sessions 3</li> </ul> Math Forum <ul style="list-style-type: none"> <li>● None</li> </ul> Daily Practice <ul style="list-style-type: none"> <li>● Sessions 1-3</li> </ul> Home Connection <ul style="list-style-type: none"> <li>● Sessions 1, 2</li> </ul>
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Possible Misconceptions	Teacher Moves
<ol style="list-style-type: none"> <li>1. Students struggling with the various ways to read and write numbers.</li> <li>2. When comparing numbers, students may focus on the number furthest to the left to determine the greater number rather than considering place value. For example, a student may say 952 is greater than 2,354 because 9 is greater than 2.</li> <li>3. Rounding to a place within a number can be difficult for students. For example, rounding 1,266 to the nearest ten means that students must recognize that it falls between 1,260 and 1,270</li> </ol>	<ol style="list-style-type: none"> <li>1. Students who struggle should focus on the groups of digits before, between, and after commas. The comma preceding the units groups represents the thousands group, the comma preceding the thousands group represents the millions group. Some students will need more practice to relate understanding to developing skill reading and writing numbers.</li> <li>2. Approximating the location of numbers on the number line will help students to focus on the overall place value to help them determine which number is greater. Later, identifying place value by writing numbers using graph paper and aligning the digits starting with the ones place will help students to see that 2,000 is greater than 900. It is important that students realize they are lining up numbers in column by place value and not be a random rule.</li> <li>3. Understanding place value and thinking flexibly about the meaning of places in a number along with practice will help students to be successful rounding to any place. It is important that students make generalizations and use steps that make sense to them. Giving students meaningless rules about rounding up or rounding down often causes much confusion.</li> </ol>

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<p>4. Students who struggle with the algorithm in addition and subtraction.</p> <p>5. Watch for students who subtract the smaller digit from the larger regardless of their position in the problem.</p> <p>6. Some students misunderstand that the larger the unit, the smaller the number you get when you measure. Students may incorrectly think that larger units will give larger measures.</p> <p>7. Some students may have difficulty converting a word problem into the necessary mathematical form needed to solve the problem.</p>	<p>4. These students need more experiences with concrete materials ( place value charts, bundling and unbundling straws into tens and hundreds). Be sure to scaffold examples so that students are comfortable with place value to hundreds, including one regrouping and two regroupings, and can explain their work before they work with four- and five-digit numbers or multiple addends.</p> <p>5. These students need additional work with concrete models and decomposing tens or hundreds. Make connections between the work with models and the written equations explicit.</p> <p>6. To correct this common misconception, provide additional experiences for students to measure the same object with two different measuring units.</p> <p>7. To address this, teachers need to provide multiple experiences with measurement problems on an ongoing basis.</p>
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**Vocabulary and Representations**

<b>Tier 2 (Academic Vocabulary)</b>	<b>Tier 3 (Domain Specific Vocabulary)</b>
capacity conversion cup (c.)* difference* foot (ft.)* gallon (gal.)* hour (hr.)* inch (in.)* interval* maximum minimum minute (min.)* ounce (oz.)* pound (lb.)* quart (qt.)* regrouping round/rounding* scale	addend* algorithm bar graph* benchmark centimeter (cm)* constant difference customary system decade digit(s)* elapsed time expanded form gram (g)* graph* hundred thousand* kilogram (kg)* kilometer (km)* line plot* liquid volume*

<p>second (sec.) table weight*</p> <p>*Smarter Balanced Vocabulary is focused on major mathematical concepts. (Not all possible words have been identified by SBAC)</p> <p>+ Students are not responsible for these vocabulary words at this grade level, however they should have some understanding of the mathematical concept.</p>	<p>liter (l)* mass* median + meter (m)* metric system* milliliter (ml)* million* millimeter (mm) minuend + mode + range + subtrahend + ten thousand* volume*</p>
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### Mathematics Teaching Practice Resources

1. **Bridges** - Reference Math Practices in Action Notes - The notes identify how particular mathematical practice is employed in a specific activity.
2. [Math Practices Teacher Question Starters](#)
3. [Implementing the Standards of Mathematics Practice](#)
4. [Illustrating the Standards of Mathematical Practice](#)
5. [Math Practice Standards Posters Gr. 4-5](#)
6. [Grade 4 - Standards + Practices - Explanations and Examples](#)
7. [Number Talks Matter - Number Talks at a Glance](#) and [Fluency without Fear](#)
8. [Use and Connect Mathematical Representations](#)
9. [Pose Purposeful Questions](#)
10. [Mistakes are Powerful](#) - Resource to develop students' perseverance through mistakes
11. [Journal Prompts for Math](#)
12. [Bridges Interactive Math Manipulatives](#)
13. [Accountable Talk Moves](#)
14. [Contribution Checklist](#)
15. [Sentence Frames that Can Build Metacognitive Thinking](#)
16. [Sample Language Frames for Mathematics](#)
17. [Building a Mathematical Mindset Community](#)
18. [Fletcher Three Act Tasks](#)
19. [Vocabulary Development Frayer Model](#) – Elementary and secondary video and resources.
20. [Bridging Practices - UCONN](#) – Training and a Task Repository to develop and support student capacity for argumentation in mathematics
21. [Illustrative Math – Grade 4](#) - Resources and activities for grade 2 aligned by standard.
22. Learn Zillion
  - [Read and Write Numbers in Expanded Form](#)
  - [Solve Multiplicative Comparison Word Problems](#)
  - [Round Numbers to a Specified Place on a Number Line](#)
  - [Round in Real Life Situations](#)
  - [Add Using the Standard Algorithm](#)
  - [Subtract Using the Standard Algorithm](#)
  - [Recognize Common Units of Measure](#)

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- [Compare and Convert Customary Units of Measure](#)
- [Compare and Convert Metric Units of Length](#)
- [Convert Measurements to Solve Distance Problems](#)

## Suggestions for Differentiation, Scaffolding and Intervention

### Differentiation or Intervention

**Any teacher moves/strategies that address misconceptions can be used in differentiation or as intervention.**

**Math Teaching Practice Resources contain resources that provide opportunities for differentiation, intervention, or extension aligned to the strategies below.**

- [How to Select Math Intervention Content](#)
- [Coherence Map in Math](#) – The coherence map shows how standards within and across grades build upon each other. You can use the map to assist you in to build student understanding by linking together concepts within and across grades and identify gaps in a student's knowledge by tracing a standard back through its logical prerequisites.
- [CT Dept. of Education Evidence-based Practice Guides](#) – These guides provide links to “evidence-based activities, strategies and interventions (collectively referred to as 'interventions').”
- Evidenced-based strategies for supporting struggling students (U.S. Dept. of Education – [What Works Clearinghouse](#))
- Ensure instructional materials are systematic and explicit. In particular, they should include numerous clear models of easy and difficult problems, with accompanying teacher think alouds.
- Provide students with opportunities to solve problems in a group and communicate problem-solving strategies.
- Teach students about the structures of various problem types, how to categorize problems based on structure, and how to determine appropriate solutions for each problem type.
- Students should work with visual representations of mathematical ideas.
- If visual representations are not sufficient for developing accurate abstract thought and answers, use concrete manipulative first. (Include the next line for middle school and older students only) Although this can also be done with students in upper elementary and middle school grades, use of manipulatives with older students should be expeditious because the goal is to move toward understanding of and facility with visual representations and finally to the abstract.
- Provide carefully constructed questions to help direct students in determining what to do to solve problems, but they shouldn't be told how to reach the solution.
- Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.
- Break multi-step problems into individual steps.

### Intervention for facts

- Provide about 10 minutes per session of instruction to build quick retrieval of basic arithmetic facts. Consider using technology, flashcards, and other materials for extensive practice to facilitate automatic retrieval.

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- For students in K -2 explicitly teach strategies for efficient counting to improve the retrieval of mathematics facts.
- Teach students in grade 2-8 how to use their knowledge of properties, such as commutative, associative, and distributive to derive facts in their heads.
- [How to Promote Acquisition of Math Facts – Intervention for struggling students](#)
- [National Center on Intensive Intervention - Basic Facts](#)
- Once a strategy has been taught, it is important to reinforce it. The reinforcement or practice exercises should be varied in type and focus as much on the discussion of how students obtained their answers as on the answers themselves.
- Having students work in groups (as opposed to handing your bright students a workbook to work on when the classroom material isn't challenging enough) with other children ready for advanced material shows them that mathematics is not a solitary discipline -- mathematics is exciting and vibrant and creative and fun.
- [Concrete, Representational, Abstract Progression](#)

#### EL Strategies

- [Colorin Colorado](#) – A Bilingual site for educators and families of English learners
- [Stanford University - Principles for Mathematics Instruction of ELs](#)
- [CT State Dept. Of Education English Learner Standards and Resources](#)
- Nonverbal responses, such as thumbs up, will help you check for understanding without requiring students to produce language. ELLs can participate and show that they understand a concept, or agree or disagree with an idea, without having to talk. This is especially important for students whose comprehension of English is more advanced than their ability to speak the language.
- Pre-teach vocabulary in ways that connect to students' prior knowledge.
- Display posters of graphic representations of vocabulary words.
- <http://www.cal.org/siop/lesson-plans/>
- Provide support to assist in explaining thinking with sentence starters and work banks.
- Use Work Place Sentence Frames or other sentence frames to assist students in math discourse.
- Speak slowly and use clear articulation. Reduce the amount of teacher talk and use a variety of words for the same idea. Exaggerate intonation and place more stress on important new concepts or questions. After asking a question, wait for a few moments before calling on a volunteer. Writing the question on the board will also help.
- English language learners are not always able to answer the questions posed to them, especially when the questions are open-ended. Provide support for and improve the participation of students with lower levels of English proficiency by using a prompt that requires a physical response, like "Show me a half, a third, etc.." or "Touch the larger number."
- [Increase academic language knowledge for English learner success.](#)

#### Extension

- [Buyer Beware](#) - Problem Solving using all four operations
- [Great Estimations](#) - Applying measurement concepts of composing and decomposing units to solve a discovery based task.

### Interdisciplinary Connections

**Children's Literature \* Bridges recommended titles - # Titles embedded in Bridges Units**

*#Hottest, Coldest, Highest, Deepest* by Steve Jenkins     \**How Much is a Million?* by David Schwartz

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*\*If You Made a Million* by David Schwartz

*\*Can You Count to a Googol?* by Robert E. Wells

*\*On Beyond a Million* by David Schwartz

*\*Is a Blue Whale the Biggest There Is?* by Robert E. Wells

### **Science**

- Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems.
- Organize simple data sets to reveal patterns that suggest relationships.