

Winchester Math Curriculum Grade 2

Subject	Mathematics
Grade/Course	Grade Two
Unit of Study	Unit 7- Measurement, Fractions, and Multi-Digit Computation with Hungry Ants
Pacing	April
Unit Summary	This unit addresses metric measurement, fractions, multi-digit addition and subtraction. Students measure the lengths of objects in centimeters. They also measure longer lengths and distances in meters. Students begin an investigation into division and fractions. Students generate strategies for adding and subtracting three-digit numbers and look closer for the most effective and efficient strategies. They also work with these concepts in the context of story problems.
<u>Overarching Mathematical Practices</u>	
<p>2.MP.1 Make sense of problems and persevere in solving them.</p> <p>2.MP.2 Reason abstractly and quantitatively.</p> <p>2.MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>2.MP.4 Model with mathematics.</p> <p>2.MP.5 Use appropriate tools strategically.</p> <p>2.MP.6 Attend to precision.</p> <p>2.MP.7 Look for and make use of structure.</p> <p>2.MP.8 Look for and express regularity in repeated reasoning.</p>	
<u>Unit CT Core Content Standards</u>	
<p><u>2.OA.A.1-</u> Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.¹</p> <p><u>2.NBT.B.7-</u> Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.</p> <p><u>2.NBT.B.9-</u> Explain why addition and subtraction strategies work, using place value and the properties of operations.²</p> <p><u>2.MD.A.1-</u> Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p> <p><u>2.MD.A.3-</u> Estimate lengths using units of inches, feet, centimeters, and meters.</p> <p><u>2.MD.A.4-</u> Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.</p> <p><u>2.MD.B.5-</u> Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.</p> <p><u>2.MD.C.8-</u> Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately.</p>	

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2.G.A.3- Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

¹ See [Table 1](#) for problem types

² Explanations may be supported by drawings or objects

“Unwrapped” Standards	
Skills	Content
Use	<ul style="list-style-type: none"> ● Addition and subtraction within 100 and 1000 ● Concrete models, drawings, and strategies based on place value ● Place value and properties of operations ● \$ and ¢ appropriately
Solve	One- and two-step word problems including <ul style="list-style-type: none"> ● adding to ● taking from ● putting together ● taking apart ● comparing with unknown in all positions <ul style="list-style-type: none"> ● Word Problems involving money
Understand	In adding and subtracting, one adds or subtracts hundreds from hundreds, tens from tens, and ones from ones
Compose or decompose	Tens or hundreds
Explain	Why addition and subtraction strategies work
Measure	Length of objects
Select and use	Appropriate tools
Estimate	Lengths
Measure and Determine	How much longer one object is than another
Express	Length difference in standard length units
Partition	Circles and Rectangles into two, three, or four equal shares
Describe	<ul style="list-style-type: none"> ● Equal shares using words halves, thirds, half of, a third of, etc... ● The whole as two halves, three thirds, four fourths
Recognize	Equal shares of identical wholes need not have the same shape
Essential Questions	Corresponding Big Ideas
1. How do operations affect numbers?	1. Operations create relationships between numbers that are acted upon by using

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<ol style="list-style-type: none"> 2. Why is measurement important in the real world? 3. How can you represent the same number different ways? 4. How can mathematics support effective communication? 	<p>mathematical procedures to calculate and determine a new value.</p> <ol style="list-style-type: none"> 2. Measurement is important because it helps us understand and describe our world. It is an essential part of our everyday life. Everything that we purchase, create, design, and build uses measurement in some form. 3. The same number can be represented differently by composing and/or decomposing using physical models, diagrams, and number expressions. 4. Mathematics increases effective communication when attending to precision using accurate terminology in making mathematical statements and expressing strategies and answers with a degree of precision appropriate for the context of the problem/situation.
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Evidence of Learning - Assessment

Pre/Post Assessment	Interim Assessment	Additional Evidence of Learning
<ul style="list-style-type: none"> • Unit 7 Pre-Assessment, Module 1, Session 1 • Unit 7 Post-Assessment, Module 3, Session 5 	<ul style="list-style-type: none"> • Metric Measuring & Fractions Checkpoint - Module 2, Session 5 	<p>Options</p> <ul style="list-style-type: none"> • Exit Tickets <p>Observational Assessment</p> <ul style="list-style-type: none"> • Race to the Cookie Jar - M1, S1 • Estimate and Measure Centimeters - M1, S3 • Ant Paths - M1, S5 • Fair Shares - M2, S4 • The Gardener's Friend Game - M3, S1 • The Ants' Toy Story Problems Work Sample

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

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.

Learning Plan

Researched-based Instructional Resources and Methods

Sequence of Instruction:

Number Talk/Number Corner → Problem + Investigations → Work Places → Home Connections

Bridges Number Corner: The focus areas for Number Corner aligned to Unit 7 are:

- Addition and Subtraction
 - Add and subtract within 20
 - Using mental strategies add and subtract within 20
- Fractions
 - Partitions circles in 2,3, or 4 equal parts
 - Demonstrate an understanding of equal parts of identical wholes do not have to be the same shape
- Measurement
 - Select and use the appropriate tool for measuring the length of an object
 - Measure length to the nearest whole unit in centimeters
 - Determine how much longer on object is than another, and express the difference in terms of a standard unit length.
 - Solve addition story problems with sums to 100 involving lengths given in the same unit.
- Math Practice Standards
 - Make sense of problems and persevere in solving them
 - Model with mathematics
 - Look for and make use of structure
 - Look for and express regularity with repeated reasoning

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

Module 1	Module 2	Module 3	Module 4
Problem + Investigation ● Sessions 1-5 Work Place ● Sessions 1-5 Home Connection	Problem + Investigation ● Sessions 1-5 Work Place ● Sessions 3-5 Home Connection	Problem + Investigation ● Sessions 1-4 Work Place ● Sessions 1,4,5 Home Connection	Problem + Investigation ● Sessions 1-3 Work Place ● Sessions 2,3,5 Home Connection

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● Sessions 1,3,5	● Sessions 2 + 4	● Sessions 1,3,5	● Sessions 2 + 4
Possible Misconceptions		Teacher Moves	
<ol style="list-style-type: none"> 1. Having difficulty interpreting problem situations to determine a solution pathway. 2. Struggling to interpret and solve two-step problem situations. 3. Struggling to compute accurate answers when adding and subtracting. (Possibility caused by not knowing basic facts). 4. Difficulty in regrouping (composing hundreds from tens and ones) when adding two 3-digit numbers and (decomposing from hundreds to tens and ones) when subtracting two 3-digit numbers. 5. Some students will struggle with solving word problems in a variety of situations. 	<ol style="list-style-type: none"> 1. Teaching keywords DOES NOT help students develop an understanding of problem situations. Use concrete models, drawing pictures, and acting out problems so students can relate actions to whether the situation call for addition or subtraction. In missing addend cases, students will determine what operation (addition and subtraction) makes the most sense to them, as either will result in a correct solution. 2. Provide experiences where students work to identify missing information needed to solve the problems. While the question in the problem will focus on the final answer, identifying missing information will help students recognize they need to perform an operation to find the information. Taking away the stress of finding the answer will help students focus on what needs to happen and not just answer getting. 3. Students should continue to work to become efficient and fluent with basic facts, but to move computation forward use physical models to help develop accurate addition and subtraction. Be sure ALL students have ample opportunities adding physical models on place value charts, and using benchmark numbers (hundreds, tens, and ones) on an open number line. Make explicit connections from written to physical models and strategies to written formats. 4. Use physical models and have students explain their reasoning. Explicit connections to written equations will help students make the transition from concrete and pictorial representations to symbolic notation. 5. Support their thinking by asking what they know, what they want to find out, and how they might solve the problem. It is 		

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<p>6. Students may begin to measure starting with 1 on the ruler, yardstick, or meter stick.</p> <p>7. Many students do not clearly understand the purpose of estimation. They give wild estimates or they provide appropriate estimates but become frustrated to not be able to give the correct number.</p> <p>8. Some second graders may think that the numbers of a ruler or yardstick are for counting the marks instead of the units or spaces between the marks.</p> <p>9. Some students think they can only measure lengths with a ruler starting at the left edge.</p> <p>10. Students lack understanding of money as a measurable attribute and make over-generalizations about the value of coins based on size of coin.</p>	<p>really important for these students to ask if their answer is reasonable. It may help to reverse the situation. Ex. There are 25 apples on a tree and 17 fell off. How many are left on the tree? Ask If I put 17 apples back on the tree with the 8 that are left would I have the 25 apples I started with. Give students opportunities to explain their thinking, even if incorrect, because this provides opportunities for them to self-correct.</p> <p>6. Place a large number line on the floor. Using classroom objects to measure, demonstrate where students must begin measurement and then have students physically place themselves on the number line where to start measuring and where to end.</p> <p>7. Provide additional estimation experiences along with discussion about the purpose of estimation.</p> <p>8. Engage students in discussions about measuring devices and demonstrations on how to measure.</p> <p>9. Provide additional experiences for students to use measuring devices correctly. (Observe as students measure objects to determine specific measurement errors that may occur.)</p> <p>10. Students need to make sense of the attributes; pennies, nickels, dimes, quarters, and dollar bills, in order to accurately use them. Provide opportunities to make comparisons based on attributes. Relating the idea that money is a measurable attribute will assist students in understanding how money amounts are measured.</p>
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Vocabulary and Representations

Tier 2 (Academic Vocabulary)	Tier 3 (Domain Specific Vocabulary)
<p>addition cent change</p>	<p>centimeter* decimal point equation*</p>

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<p> difference* divide* division dollar eighth equal groups* estimate* fair fourth fraction* half hundreds* left over length* measure* multiples* predict/prediction problem solving quarter (one-fourth) ruler share skip-counting story problems strategy/strategies third total unit* whole </p>	<p> meter* place value subtraction sum* </p> <p> *Smarter Balanced Vocabulary IS focused on major mathematical concepts. (Not all possible words have been identified by SBAC) + Students are not responsible for these vocabulary words at this grade level, however they should have some understanding of the mathematical concept. </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.
 - a. additional resources will be able to be linked with the purchase of Bridges.
2. [Math Practices Teacher Question Starters](#)
3. [Implementing the Standards of Mathematics Practice](#)
4. [Illustrating the Standards of Mathematical Practice](#)
5. Grade 2 - [Standards + Practices - Explanations and Examples](#)
6. [Exploring the Math Practice Standard: Precision](#)
7. [Number Talks Matter - Number Talks at a Glance](#) and Fluency without Fear
8. Howard County Math Resources
 - [Good Questioning Strategies by Content](#)
 - [Number Talks Routine Videos](#)
 - [Number Strings Routines](#)
 - [Money Count Around](#)
 - [Three Act Math Resources](#)
9. [Journal Prompts for Math](#)
10. [Bridges Interactive Math Manipulatives](#)
11. [Illustrative Math – Grade 2](#) - Resources and activities for the grade aligned by standard.

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12. [Accountable Talk Moves](#)
13. [Contribution Checklist](#)
14. [Sentence Frames that Can Build Metacognitive Thinking](#)
15. [Sample Language Frames for Mathematics](#)
16. [Building a Mathematical Mindset Community](#)
17. [Teacher/Student Actions](#)
18. [Fletcher Three Act Tasks](#)
19. [Vocabulary Development Frayer Model](#) – Elementary and secondary video and resources.
- 20.

Suggestions for Differentiation, Scaffolding and Intervention

Differentiation or Intervention

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

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.

Intervention for facts

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- 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.
- 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.
- Struggles with basic facts - need more experience with concrete and pictorial representations, including describing what their models represent to make connection to basic facts. Time and experience with developing strategies that are based on patterns and properties will help support learning the facts. It is important to give students time to learn and understand these concepts before procedural skill practice takes place.
- [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 EL](#)
- [CT State Dept. Of Education English Learner Standards and Resource](#)
- All directions, questions, explanations, and instructions need to be delivered in the most clear and concise manner and that the appropriate pace for the student.
- [Increase academic language knowledge for English learner success.](#)
- While it is difficult to know when to correct students, constructive and effective feedback is essential to student progress. It is possible for incorrect language production to become "fossilized" so that students continue to use the same incorrect structures into adulthood. This reduces their chances of being a clear communicator and ultimately limits them in professional settings. Nevertheless, it is important to balance between encouragement and error correction. One way to do this is to focus on one or two concepts at a time when listening to or reading student work. Let students know what you will be focusing on so that they in turn can focus on those particular concepts in the assignment.
- 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.

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- 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."

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Extension

- Pair students working roughly at the same level and invite them to try game variations provided in Work Place Guides.
- Students can create their own addition and subtraction problems.
- Ask students to create and solve their own story problems.
- Create higher order thinking questions that fit with the big concepts of the unit. Limit to a couple of questions. Ex. What would happen if _____? How would you explain _____? Use the higher order questions to challenge students thinking. For example; How would you explain to someone how many addition or subtraction problems can equal the same total? How many equal 100?

Interdisciplinary Connections

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

#One Hundred Hungry Ants, Elinor J. Princes
 *For Good Measure, Ken Robbins
 The Go Around Dollar, Barbara Johnson Adams
 Follow the Money, Loreen Leedy
 Pigs will be Pigs, Amy Axelrod
 Arthur’s Funny Money, Lillian Hoban
 Yard Sale, James Stevenson
 .Silverstein, Shel. Where the Sidewalk Ends. New York: HarperCollins, 1974.

Let’s Find Out About Money, Kathy Barabas
 *How Long or How Wide?, Brian P. Cleary
 26 letters and 99 cents, Tana Hoban
 My Rows and Piles of Coins, Tolowa Mollé
 Benny’s Pennies, Pat Brisson
 Monster Money, Grace Maccarone

Language Arts

- Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section in order to communicate mathematics with precision.
- Participate in collaborative conversations with diverse partners about *grade 2 math topics* with peers and adults in small and larger groups.

Art

- Use elements of art and principles of design to effectively communicate math ideas.

Science

- Use accurate measurement vocabulary and appropriate tools to make measurements related to science concepts.