Winchester Math Curriculum Grade 2

Subject	Mathematics
Grade/Course	Grade Two
Unit of Study	Unit 3
Pacing	November / December
Unit Summary	Second graders will focus on strategies for solving multi-digit addition and subtraction within 100. Strategies include use of a number line, skip counting, base ten structure. Students will also work to determine the frequency of which objects appear and graph that data.

Overarching Mathematical Practices

2.MP.1 Make sense of problems and persevere in solving them.
2.MP.2 Reason abstractly and quantitatively.
2.MP.3 Construct viable arguments and critique the reasoning of others.
2.MP.4 Model with mathematics.
2.MP.5 Use appropriate tools strategically.
2.MP.6 Attend to precision.
2.MP.7 Look for and make use of structure.
2.MP.8 Look for and express regularity in repeated reasoning.

Unit CT Core Content Standards

2.OA.A.1- 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.
2.OA.B.2- Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
2.OA.C.3- Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
2.NBT.A.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.
2.NBT.A.2- Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.A.3- Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
2.NBT.A.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.
2.NBT.B.5- Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.NBT.B.6- Add up to four two-digit numbers using strategies based on place value and properties of operations.
2.NBT.B.9- Explain why addition and subtraction strategies work, using place value and the properties of operations.
2.MD.A.1- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References

2.MD.A.3- Estimate lengths using units of inches, feet, centimeters, and meters.
2.MD.A.4- Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
2.MD.B.5- 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.
2.MD.B.6- Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.
2.MD.D.10- Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

"Unwrapped" Standards	
Skills	**Content**
Use	● addition and subtraction within 100 to solve one- and two-step story problems ● drawings and equations with a symbol for the unknown number
Fluently add and subtract	● within 20 using mental strategies ● within 100 using strategies
Know	from memory all sums of two one-digit numbers
Determine	whether a group of objects (up to 20) has an odd or even number by pairing objects or counting them by 2s.
Write	an equation to express an even number as a sum of two equal addends.
Understand	three digits of a three-digit number represents amounts of hundreds, tens, and ones.
Count	● within 1000 ● by 5's, 10s, and 100s
Read and write	numbers to 1000 using base-ten numerals, number names, and expanded form
Compare	two three-digit numbers use >, =, < symbols to record results
Add	up to four two-digit numbers using strategies
Explain	why addition and subtraction strategies work, using place value and properties of operation
Measure	● the length of an object ● to determine how much longer one object is than another
Select and use	appropriate tools for measuring
Express	length and length difference in terms of a standard length unit
Estimate	lengths
Use addition and subtraction	with 100 to solve word problems involving lengths

	of the same units
Represent	- whole numbers as lengths from 0 on a number line with equally spaced points - whole number sums and differences with 100 on a number line. - a data set with up to four categories
Draw	a picture or bar graph (with a single unit scale)
Solve	problems using information presented in a bar graph

Essential Questions	Corresponding Big Ideas
1. How can strategies help us add and subtract?	1. Strategies can help us build a better understanding of the relationships between numbers and operations. Some strategies that can help us add and subtract are using place value, properties of operations,composing and decomposing numbers, and the relationship between addition and subtraction, creating easier, but known results.
2. What are efficient methods for finding sums and differences?	2. Flexible methods of computation involve grouping numbers in strategic ways, such as by place value, properties of operations, composing/decomposing. etc.
3. How do we decide which tool to use to measure something?	3. The choice of measurement tool depends of the measurable attribute, the size of the object, and how precise we need the measurement.
4. What do we measure?	4. Objects have attributes that we measure. such as length, width,height, weight, etc.

Evidence of Learning - Assessment		
Pre/Post Assessment	**Interim Assessment**	**Additional Evidence of Learning**
- Unit 3 Pre-Assessment - Module 1, Session 1 - Unit 3 Post-Assessment - Module 3, Session 7	- Addition and Subtraction Checkpoint - M2, S5 - Presents and Parcels Story Problem Work Sample - M2, S6-7	Options [Exit tickets] Observational Assessments - Star Power - M1, S3 - Hit the Zone - M2, S4 - Base Ten Triple Spin - M3, S1 - Target Twenty - M3, S5 - Math Practices Observation Chart

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. [Bibliography References]

Smarter Balanced Interim Assessment

Smarter Balanced General Scoring Rubrics - 4 Rubrics included - Score Pt 4 to Score Pt 1

 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.

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 Corner→ Problem + Investigations→Work Places→Home Connections

Bridges Number Corner: The focus areas for Number Corner aligned to Unit 3 are:
Measurement
- Telling time to the hour, half-hour, and quarter hour using analog and digital clocks
- Discuss patterns in changing time
- Measure objects with two different units
- Estimate length
- Compare estimates and actual length
- Understand reported length depends on the size of the unit

Computation
- Building arrays
- Writing addition equations to represent arrays
- Doubles and Doubles plus One facts with a focus on combinations between 10 and 20
- Subtraction combinations of take all (15 -15, 12 - 12 etc.) and take half (12 - 6, 14 - 7, etc.)

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

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

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References

Assessment ● Session 1 Home Connection ● Sessions 1, 3, 5	Assessment ● Session 5 Home Connection ● Sessions 2, 4	Assessment ● Sessions 6, 7 Home Connection ● Sessions 3, 5, 7	Home Connection ● Session 2

Possible Misconceptions	**Teacher Moves**
1. Teaching key words does not help students to develop an understanding of problem situations.	1. Rather use concrete models and drawing pictures, students can relate their actions to whether the situation calls for addition or subtraction. In missing addend cases, student will determine what operation (addition or subtraction) makes the most sense to them, as either will result in a correct solution.
2. Students who struggle with two-step problems.	2. These students should work to identify missing information needed to solve the problem. While the question in the problem will focus on the final answer, identifying missing information will help students to recognize they need to perform an operation to find that information.
3. Watch for students who make reasoning errors when working with concrete materials or objects as they begin to use more sophisticated strategies.	3. Students may double count a number when adding or subtracting. This may occur with physical objects or pictures or using a hundreds chart. Students may decompose a number to make a ten and then incorrectly add the original addend on to the 10. The sooner such misconceptions are addressed through questions and the use of concrete examples, the more likely the student is to self-correct with similar examples.
4. Students do not have to be fluent with all the mental strategies.	4. They should have many opportunities to practice, explain, and compare strategies. Using the strategies that makes sense to them will help students to be ready for drill and practice opportunities to become fluent with facts.
5. Students who have difficulty counting within 1000.	5. These students need more experience counting on with concrete, pictorial, and number line representations. Begin with lesser numbers in the range of 100 -200. Point out patterns in the ones and tens places. Watch for student who confuse

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References

6. Second grade students <u>do not</u> need to have facility using the standard algorithm adding and subtracting.
7. Although some students may be ready to write equations, composing tens when regrouping in addition and decomposing tens when regrouping in subtraction may be challenging to other students.
8. Students who struggle with adding strings of numbers should begin with three addends with no regrouping.

9. Students may still struggle with solving word problems in a variety of situations.

10. Some students may illustrate a measurement word problem by drawing a lovely picture that does not match the problem. Some students may not be able to solve and write an equation to show how they solved the problem.

11. Some students may solve problems on a number line by modeling the jumps by ones, which is a tedious process.

the next number in the tens place. For example, counting 127, 128, 129,...1? An extended hundreds chart with counts from 100 to 200 can be helpful.
6. They should focus their work on developing and using efficient strategies that make sense.
7. Concrete representations, number lines, and hundreds charts will help students to develop a deeper understanding of the process of regrouping than only following rote procedures.
8. If necessary, they can use physical models to help keep track of sums. Move to examples using four addends without regrouping. As students are ready, include examples with regrouping. Encourage students to use strategies that make sense to them. Help students using inefficient strategies to make connections to more efficient strategies. Note that some strategies are more difficult to follow when written out and make more sense when explained orally.
9. Support their thinking by asking what they know, what they want to find out, and how they might solve the problem. It is really important for these students to ask themselves if their answer is reasonable. You may need to help by reversing the situation for them. Giving students opportunities to explain their thinking, even when incorrect,, provides opportunities for them to self-correct.
10. To address these issues, work with students to continue providing additional problems and examples. Use concrete objects rather than pictures to help students make sense of the problem versus allowing them to draw pictures, Listen to students' thinking as they attempt to solve the problems, correcting errors as you are interacting with the students.
11. To help them, provide additional work using a hundreds chart to show groups of objects by five and tens. Model and

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. <u>Bibliography References</u>

	provide more experiences for the students to jump, or hop, on the number line by fives and/or tens.
Vocabulary and Representations	
Tier 2 (Academic Vocabulary)	**Tier 3 (Domain Specific Vocabulary)**
appropriate tools compare difference* estimation* even express height left over length* multiple* odd prediction subtract* symbol* total	addition* bar graph* data set equation* expanded form + expanded notation + measurement* open number line place value* properties of operations + split strategy subtraction* sum* *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.

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.
   - 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. Fletcher Three Act Tasks
9. Bridges Interactive Math Manipulatives
10. Teacher/Student Actions
11. Journal Prompts for Math
12. Accountable Talk Moves
13. Contribution Checklist
14. Sentence Frames that Can Build Metacognitive Thinking
15. Sample Language Frames for Mathematics

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References

16. [Addition and Subtraction Problem Types](#)
17. Learn Zillion Grade 2:
    - ○ [Understand a Word Problem](#)
    - ● [Solving Word Problems by Drawing Bar Models](#) (similar to Tape Diagrams)
    - ● [Decompose and Compose Numbers](#)
    - ● [Add within 100 using Base Ten Blocks](#)
    - ● [Subtract within 100 using Base Ten Blocks](#)
    - ● [Add up to Four Two-Digit Numbers Using Place Value](#)
    - ● [Solve Addition Problems Using a Number Line](#)
    - ● [Solve Addition Story Problems Using an Open Number Line](#)

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.
- ● 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
- ● 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

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. [Bibliography References](#)

facilitate automatic retrieval.
- For students in K -2 explicitly teach strategies for efficient counting to improve the retrieval of mathematics facts.
- [How to Promote Acquisition of Math Facts](#) – Intervention for struggling students
- [National Center on Intensive Intervention - Basic 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.
- 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.
- Sometimes 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.

Extensions
- Extension activities aligned with Bridges lessons are included in each module
- [Addition and Subtraction Strategies: Agree or Challenge](#) Students will work in pairs. One student will think of an addition or subtraction problem and choose an efficient strategy to solve the problem. Then the student will give the problem to the other student who will solve the problem and explain his/her strategy to the partner. The problem poser will ask questions about the explanation or tell how the strategy matched the strategy he/she used. Students will discuss the benefits of a particular strategy.

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References

- **What Time in the World** - Students will find the current digital time here and in other parts of our country/ other countries and will record the times on analog clocks. Activity Sheet

Interdisciplinary Connections

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

More M&M's Math by Barbara McGrath   *Arctic Fives Arrive* by Elinor Pinczes
*The Long Wait by Annie Cob   *The Best Vacation Ever* by Stuart J. Murphy
Elevator Magic by Stuart Murphy   *Rooster's Off to See the World* by Eric Carle
Count on Pablo by Barbara DeRubertis and Rebecca McKillip Thornburgh
One Hundred Hungry Ants by Elinor Pinczes

Science

- Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.

ELA

CCSS.ELA-LITERACY.SL.2.1

Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups.

CCSS.ELA-LITERACY.SL.2.1.A

Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

CCSS.ELA-LITERACY.SL.2.1.B

Build on others' talk in conversations by linking their comments to the remarks of others.

CCSS.ELA-LITERACY.SL.2.1.C

Ask for clarification and further explanation as needed about the topics and texts under discussion

Part or all information on this page is adapted or excerpted for instructional guidance in use of these resources purchased by the school district. Bibliography References