Winchester Math Curriculum Grade 1

Subject	Mathematics
Grade/Course	Grade One
Unit of Study	Unit 6- Figure the Facts with Penguins
Pacing	March
Unit Summary	First graders focus on addition and subtraction to 20. They continue to develop fluency with addition and subtraction facts to 10 and strategies for working with facts to 20. Students make extensive use of the number rack to model and solve number combinations and story problems of all types. They learn how to write and solve equations that involve unknowns in all positions and determine whether addition and subtraction equations are true or false.

Overarching Mathematical Practices

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

Unit CT Core Content Standards

1.MD.A,1- Order three objects by length; compare the lengths of two objects indirectly by using a third object.
1.MD.A,2- Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps*.
1.NBT.A.1- Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
1.NBT.B.2- Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
1.NBT.B.2b- The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
1.NBT.C.4- Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
1.OA.A.1- Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
1.OA.A.2- Solve word problems that call for addition of three whole numbers whose sum is less than or

equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
1.OA.B.3- Apply properties of operations as strategies to add and subtract.2*Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*
1.OA.B.4- Understand subtraction as an unknown-addend problem. *For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.*
1.OA.C.5- Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
1.OA.C.6- Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
1.OA.D.7- Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.
1.OA.D.8- Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ - 3, 6 + 6 = _.*

"Unwrapped" Standards	
Skills	**Content**
Order	objects by length
Compare	lengths of objects
Express	length as whole number unit
Count	to 120
Read and Write	numerals
Represent	numbers of objects with numerals
Understand	● the digits in a two-digit number represents tens and ones ● in adding two-digit numbers, add tens to tens and ones to ones ● subtraction as an unknown addend ● the meaning of the equal sign
Add	● within 100 ● two-digit and one digit numbers ● two-digit numbers and a multiple of 10 using concrete models, drawings, and strategies ● within 10 fluently ● within 20 using strategies
Subtract	● within 10 fluently ● within 20 using strategies
Relate	strategies to written method of solving addition and subtraction.
Explain	reasoning

Compose	ten
Solve	● addition and subtraction word problems to 20 with unknowns ● word problems that call for adding 3 numbers to a sum no greater than 20.
Use	● symbol for unknown ● objects, drawings, and equations
Apply	properties of operations
Relate	counting to addition and subtraction
Determine	● addition and subtraction equations as true or false ● unknown whole number in equations

Essential Questions	Corresponding Big Ideas
1. What is the purpose of the equal sign?	1. The purpose of the equal sign is to indicate a balance between two sides of an equation.
2. How can the structure of a word problem help us to solve it?	2. Word problems have basic problem solving structures: adding to, taking from, putting together, taking apart and comparing that help determine the properties of operations needed to solve the problem.
3. How do I represent and solve problems involving addition and subtraction?	3. I represent and solve problems with objects, drawings, and equations.

Evidence of Learning - Assessment

Pre/Post Assessment	Interim Assessment	Additional Evidence of Learning
● Unit 6 Post-Assessment - M3, S5 ● Number Corner Checkup 3	● Combinations and Stories Checkpoint - M2, S5	Options ● Exit Tickets Observational Assessments ● Spin to Win Bingo - M1, S4 ● What's Missing - M2, S4 ● True or False - M3, S3

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)*:**

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

Bridges Number Corner: The focus areas for Number Corner aligned to Unit 6 are:

Measurement
- Telling time to the hour and half-hour
- Counting dimes, nickels, and pennies

Number Sense
- Numbers beyond 100
- Groupings of 5, 10, 25, 50, and 100
- Ten more, Ten less than a number

Computational Fluency
- Strategies to solve equations within 20
- "Think ten"when adding numbers with sums greater than 10.
- Fact Families
- Composing and Decomposing numbers
- Commutative property of addition

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	Problem + Investigation ● Sessions 1-5 Work Place	Problem + Investigation ● Sessions 1-4 Work Place	Problem + Investigation ● Sessions 1-5 Work Place

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● Sessions 1-5 Home Connection ● Sessions 2, 5	● Sessions 1-5 Assessment ● Session 5 Home Connection ● Session 2, 5	● Sessions 1-5 Assessment ● Session 5 Home Connection ● Sessions 2, 5	● Sessions 1-5 Home Connection ● Sessions 2, 5

Possible Misconceptions	Teacher Moves
1. Watch students who reverse digits of two-digit numbers.	1. These students need more opportunities to decompose numbers into groups of ten and ones using concrete materials and then put them in the correct places on a place value chart. They describe the number in terms of tens and ones and then write the numeral below the concrete representation.
2. Observe students counting tens and ones separately from concrete representations. Watch for students who count as 10,20,1,2,3 rather than 10, 20, 21, 22, 23.	2. These students need more practice with counting.
3. Some students may have difficulty differentiating number words that sound alike, for example, fifty and fifteen.	3. Spell out these number words and include pictures and numbers. Add these to a word wall.
4. The vocabulary of comparison situations (in word problems) can cause confusions for students. While the words *more than* implies addition and *fewer than* implies subtraction, in comparison situations, that is not always the case. For example, Patty has 16 tickets for the raffle. She has 8 fewer than Marcos. How many tickets does Marcos have? Although the problem includes the word fewer, a student would actually add 16 + 8 to find the solution.	4. Modeling with concrete objects to use the information will help students realize that this is actually a comparison problem.
5. Students believe they can only take a smaller number from a larger number in subtraction.	5. Although subtraction is not commutative, it is important not to contribute to a potential student misconception by saying that you cannot take a larger number from a smaller number.
6. Students may confuse the order of parts of addition and subtraction equations.	6. Write the terms addend, missing addend, and total on cards. Write an addition equation and have students identify each part of the equation using the vocabulary cards. Write a related addition equation reversing the order of the addends and have students identify each part of the equation. Write related equation with a

	missing addend and have student repeat identifying each part of the equation with the vocabulary cards. Write related subtraction equations have students identify each part of the subtraction equation. Discuss what is similar in each equation.
7. Watch for students who double count a number when adding or subtracting. This may occur with physical objects, pictures, or using a hundreds chart.	7. This should be pointed out to students. It is essential to provide more explicit experiences with concrete materials in which the students are adding on to the given addend or subtracting from the total.
8. Some students may develop the misconception that the equal sign indicates the answer comes next or call for the action of doing the mathematical operation. When students use calculators, pressing the equal key results in the answer, which can also lead to this misconception.	8. Students should have experiences early on that reinforce that the equal sign indicates both sides of the equation represent the same amount. Using a balance scale or picture of a balance scale with the equal sign on the center helps students to understand that the equal sign means both sides are balanced. It is important to consistently repeat that the equal sign means "the same as".
9. Although students may be able to model problem situations with materials and pictures, the transition to writing equations using symbols may be more difficult for them, particularly when their reasoning requires finding a missing addend.	9. Asking students to explain their reasoning as they solve the problem with materials will help them convert what they have done with the materials to the symbolic equation. Be sure that students have multiple experiences solving equations in which the unknown is in different positions.

Vocabulary and Representations	
Tier 2 (Academic Vocabulary)	**Tier 3 (Domain Specific Vocabulary)**
add* addition* closest to combination combine difference* double equal* explain false foot (feet) (ft)* height	digit* double ten-frame equation* even number fact family missing addend* properties of operations + subtraction* ten-frame two-digit sum*

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inch (in)* join measure* minus observation pair plus separate solve story problem strategy subtract* take-away total true unknown (number) whole	*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, 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.
2. **Math Practices Teacher Question Starters**
3. Illustrating the Standards for Mathematical Practice
4. Math Practice Standards Posters Gr. K-1
5. **Implementing the Standards of Mathematics Practice**
6. Modeling with Mathematics
7. Implementing Tasks that Promote Reasoning and Problem Solving
8. Teaching Math to Young Children Practice Guide - The Teaching Math to Young Children practice guide presents five recommendations designed to capitalize on children's natural interest in math to make their preschool and early elementary school experience more engaging and beneficial.
9. Number Talks Matter - Number Talks at a Glance and Fluency without Fear
10. Learn Zillion Grade 1
    - https://learnzillion.com/resources/64472-1st-grade-math
11. Addition and Subtraction Problem Types
12. Number Sense Trajectory
13. The Progression of Addition and Subtraction
14. K-5 Math Resources - Grade 1 - Resources are listed by standards
15. Illustrative Math – Grade 1 - Resources and activities for the grade aligned by standard.
16. Journal Prompts for Math
17. Beginning to Problem Solve with I Notice, I Wonder
18. Contribution Checklist
19. Sentence Frames that Can Build Metacognitive Thinking
20. Sample Language Frames for Mathematics
21. Building a Mathematical Mindset Community
22. Teacher/Student Actions
23. Fletcher Three Act Tasks

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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

- 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

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- 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 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

- Ask students to write about place value. Ask, "If you had a choice to have some tens and some ones, how many would you choose of each and how many would you have altogether? Why? "
- 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 facts there are that equal only one sum? How many equal 6, 10?

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- Have the child count a collect of at least 120 objects. As the child to model how the collection was counted using interlocking cubes and explain why that method was chosen. Have the child demonstrate another possible way to count the same collection.
- Have child take as many counting objects as they can handle to model and make as many addition and subtraction equations as possible. The child should then model (write a contextual situation) for one or more of the equations.

Interdisciplinary Connections

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

**Tacky and the Emperor* by Helen Lester
**Plenty of Penguins* by Sonia Black
Mission Addition by Loreen Leedy
If You Were a Minus Sign by Trisha Shaskin
**All Aboard Science Reader Emperor Penguin* by Roberta Edwards
**The Emperor's Egg* (Read & Wonder) by Martin Jenkins
*National Geographic Reader - *Penguins* by Anne Schrieber
**Penguins* (Nature Watch) by Lynn M. Stone
**Penguin Chick* by Betty Tatham
**Emperor Penguin* by Patricia Tattles
**The Little Blue Penguin* by Kim Williams + Erik D. Stoops

ELA

SL.1.1
Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.
CCSS.ELA-LITERACY.SL.1.1.A
Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.1.B
Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
CCSS.ELA-LITERACY.SL.1.1.C
Ask questions to clear up any confusion about the topics and texts under discussion

Science

- Use counting and numbers to identify and describe patterns in the natural and designed world(s).
- Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.