

Winchester Math Curriculum Grade K

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| Subject | Mathematics |
| Grade/Course | Kindergarten |
| Unit of Study | Unit 6- Three-Dimensional Shapes & Numbers Beyond Ten |
| Pacing | March |
| Unit Summary | This unit emphasizes the two critical areas for kindergarten mathematics identified by the Common Core State Standards: numbers and geometry. The first two modules focus on geometry, while the last two modules focus on number and operations. To start the unit, students describe the attributes, similarities, and differences among two-dimensional and three-dimensional shapes. These early sessions also include activities in which students count and make combinations to 5. Later in the unit, students count forward and backward, read and write numerals to 20, and explore combinations of numbers from 5 to 10, with special emphasis on the numbers 5+ and 10+ combinations. Each student receives a Student Book at the start of this unit, which they will use for independent work for the rest of the school year. |

Overarching Mathematical Practices

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

Unit CT Core Content Standards

- K.CC.A.1- Count to 100 by ones and by tens.**
- K.CC.A.2- Count forward beginning from a given number within the known sequence (instead of having to begin at 1).**
- K.CC.A.3- Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).**
- K.CC.B.4a- When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.**
- K.CC.B.4b- Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.**
- K.CC.B.4c- Understand that each successive number name refers to a quantity that is one larger.**
- K.CC.B.5- Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.**
- K.CC.C.6- Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.**
- K.CC.C.7- Compare two numbers between 1 and 10 presented as written numerals.**

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K.G.A.1- Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.

K.G.A.2- Correctly name shapes regardless of their orientations or overall size.

K.G.A.3- Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

K.G.B.4- Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

K.G.B.5- Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

K.MD.B.3- Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

K.NBT.A.1- Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

K.OA.A.1- Represent addition and subtraction with objects, fingers, mental images, drawings 1, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

K.OA.A.2- Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

K.OA.B.3- Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).

K.OA.B.4- For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

K.OA.5- Fluently add and subtract within 5.

"Unwrapped" Standards

| Skills | Content |
|------------|---|
| Count | <ul style="list-style-type: none">by ones and ten to 100forward from a number other than onethe number of objects in a categoryto answer "how many?"objects |
| Say | <ul style="list-style-type: none">number names |
| Pair | <ul style="list-style-type: none">one number with one object (one to one correspondence) |
| Write | <ul style="list-style-type: none">numbers 0 to 20 |
| Represent | <ul style="list-style-type: none">number of objects with numeral |
| Understand | <ul style="list-style-type: none">successive number names mean one largerlast number named is number of objects counted |
| Identify | <ul style="list-style-type: none">groups of objects greater than, less than, or equal to another group of objectsshapes as two- or three-dimensional |
| Compare | <ul style="list-style-type: none">two numbers from 1 to 10 as written numerals |

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| | <ul style="list-style-type: none"> ● two- and three-dimensional shapes |
| Describe | <ul style="list-style-type: none"> ● shapes of objects in the environment ● relative position of objects |
| Name | <ul style="list-style-type: none"> ● shapes |
| Build | <ul style="list-style-type: none"> ● shapes from components ● by drawing shapes |
| Classify | <ul style="list-style-type: none"> ● objects into categories |
| Sort | <ul style="list-style-type: none"> ● categories by count |
| Compose | <ul style="list-style-type: none"> ● numbers 11 - 19 |
| Decompose | <ul style="list-style-type: none"> ● numbers 11-19 |
| Record | <ul style="list-style-type: none"> ● composition/decomposition by drawing or equation |

| Essential Questions | Corresponding Big Ideas |
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| <ol style="list-style-type: none"> 1. How can we use objects and drawings to solve problems? 2. What happens when we combine groups and what happens when we take groups apart? 3. Why do we compose and decompose numbers? | <ol style="list-style-type: none"> 1. Objects and drawing can be moved or show the actions used to solve the problem. 2. Adding is putting groups together and making more; subtracting is taking groups apart and making less. 3. Breaking apart and putting together numbers helps us to understand the flexibility of numbers. |

Evidence of Learning - Assessment

| Pre/Post Assessment | Interim Assessment | Additional Evidence of Learning |
|---|--|---|
| <ul style="list-style-type: none"> ● No Pre/Post Assessment ● Number Corner Checkup 3 | <ul style="list-style-type: none"> ● Cylinders, Tens & Ones Checkpoint, Module 1, Session 4 ● Three-Dimensional Shapes and Their Attributes Checkpoint, Module 2, Session 4 ● Tens and Ones Checkpoint, Module 3, Session 5 | <p>Options</p> <ul style="list-style-type: none"> ● Exit tickets <p>Observational Assessments:</p> <ul style="list-style-type: none"> ● Build Both Shapes - M2, S3 ● Make it Five - M2, S5 ● Roll, Add and Compare - 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.

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 6 are:

Counting

- Counting strategies
- Making sets of ten
- Counting by 1's and 10's on a line
- Counting forward and backward by 1's

Data

- Classify information
- Graph information
- Write equations to represent information
- Make predictions based on data

Computational Fluency

- Using objects to solve subtraction problems
- Combinations to 5
- Combinations to 10

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

Possible Misconceptions

1. It is common for kindergarten students to invert or reverse numerals. With

Teacher Moves

1. Give children opportunities to have a variety of kinesthetic experiences to form

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| <p>additional experience most students will self-correct.</p> <ol style="list-style-type: none"> 2. Students who confuse the sequence of numbers (ex. 1,4,7,3,9,2), skip numbers (ex. 1,2,3,5,6,7,9...) or repeat numbers (ex. 1,2,3,4,2,3,4) 3. Words for the teen numbers may be confusing since they do not follow the pattern of other decade numbers. 4. A few students may struggle counting numbers beyond the teen numbers. 5. Students who struggle counting forward from a number other than 1 within a given range particularly numbers greater than 10. 6. Watch for students who find it confusing to say one number name with one object as they count (one-to-one correspondence) 7. Watch for students who double count an object. 8. Some students may see objects spread out as different from objects close together. 9. Some students may be able to match a quantity with a number or numeral but cannot produce that number of objects when given materials or asked to draw a picture. 10. This can be students first opportunity with comparing objects and precision with language is critical. | <p>numerals (write numerals in sand, rice, etc. before they use paper and pencil.</p> <ol style="list-style-type: none"> 2. Provide more experience in counting within a smaller range of numbers. Students should be fluent within a range before increasing the range. 3. Provide more practice reciting the teen numbers and connecting the number name with the written numeral. 4. Focus on oral patterns such as the sequence of the ones place digits in the twenties is the same as the sequence of the ones place digits in the thirties. 5. These students should master counting within a sequence before counting forward from a number in that sequence. Begin with smaller numbers and progress to greater numbers. Limit how far you want student to count and then increase the range. 6. Begin with a smaller number of objects and model saying the number name as you physically move the object. Have students do the same. 7. Physically moving the object and saying one number name for each object will help reinforce one-to-one correspondence. 8. Student should physically move the objects matching one item from one set with one item from the other set to understand that the count remains the same no matter how the objects are organized. 9. Looking for a specific quantity when given a choice of collections has a lower level cognitive demand than have to produce a set of objects for a given number. Students will need time to develop this skill. 10. Scaffold experiences that start by using concrete materials with obvious comparisons and honing in on quantities that get closer in size will provide students with the time needed to understand the concept. |
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| <p>11. Students rely on counting on their fingers or rote memorization for adding and subtracting up to 10.</p> <p>12. Students may develop the misconception that certain vocabulary always represents a particular operation.</p> <p>13. Although it is appropriate for kindergarteners to use the fingers in initial counting and exploration experiences. It is not helpful if this continues beyond these initial stages.</p> <p>14. Watch for students who miscount in their representation when they are decomposing 10.</p> <p>15. Students who cannot give a correct response to addition and subtraction facts within 5 in a reasonable amount of time (3 - 4 seconds) or are depending on counting on their fingers have not developed the necessary fluency.</p> <p>16. See unit 5 curriculum document for geometry misconceptions.</p> | <p>11. Students need time to draw pictures before working with numerical expressions and equations.</p> <p>12. It is critical that students connect what to do with the actions and/or structure of the problem situation and use models rather than look for clue words.</p> <p>13. Focus on concrete and pictorial representations to develop an understanding that numbers can be put together and taken apart in a variety of ways. Students should also have the opportunity to explain their thinking.</p> <p>14. Students need more experiences modeling how smaller numbers are decomposed and justify by counting before working with 10.</p> <p>15. Students need more practice with rote counting as well as more experience with concrete objects and drawings. Help students pattern of what happens when adding or subtracting. Subtraction facts are more difficult and require more concrete experiences.</p> |
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Vocabulary and Representations

| Tier 2 (Academic Vocabulary) | Tier 3 (Domain Specific Vocabulary) |
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| <p>add*</p> <p>attribute</p> <p>between</p> <p>circle*</p> <p>combinations</p> <p>compare</p> <p>compose +</p> <p>cone</p> <p>cube*</p> <p>decompose +</p> <p>dime</p> <p>edge</p> <p>estimate*</p> <p>expression +*</p> <p>face</p> <p>greater than*</p> <p>in all</p> | <p>addition*</p> <p>cylinder</p> <p>equation +*</p> <p>hexagon*</p> <p>pyramid</p> <p>rectangle</p> <p>rectangular prism +</p> <p>rhombus*</p> <p>sphere</p> <p>three-dimensional shape (3-D)</p> <p>triangular prism +</p> <p>trapezoid</p> <p>two-dimensional shape (2-D)</p> <p>vertex or corner*</p> |

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| less/less than* longer than more number words (1-5) ones* penny problem short/shorter than solid sort square surface tall tens* | *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. |
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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. Bridges - [Geometry Mathematics Background](#)
3. Bridges - [Cycle of Instructional Strategies for Geometry](#)
4. [Math Practices Teacher Question Starters](#)
5. [Implementing the Standards of Mathematics Practice](#)
6. [Illustrating the Standards of Mathematical Practice](#)
7. [Math Practice Posters K-1](#)
8. [K - Standards + Practices Explanations and Examples](#)
9. [Number Sense Trajectory](#)
10. [Number Talks Matter - Number Talks at a Glance](#) and Fluency without Fear
11. Teaching Channel - [Beyond Fingers; Place Value and Numbers 11-19](#)
12. [Early Mathematics - A Resource for Teaching Young Children Mathematics](#)
13. [Lessons for Learning](#) - A Collection of Math Tasks/Instructional Ideas
14. [Building Conceptual Understanding and Fluency Through Games](#)
15. [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.
16. [Illustrative Math – Grade K](#) - Resources and activities for the grade aligned by standard.
17. [LearnZillion](#) - Lesson Plans and Activities
18. PBWorks - <http://colaborativelearning.pbworks.com/w/page/31904645/Kindergarten%20Math>
19. Songs for Teaching Numbers and Counting - <http://www.songsforteaching.com/numberscounting.htm>

Suggestions for Differentiation, Scaffolding and Intervention

Differentiation/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.

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- [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](#))
- Use any of the teacher moves identified in possible misconceptions that support the development of area of concern.
- Create visual/concrete experiences for students in decomposing numbers. For example, have students use red and blue color tiles to represent the number being decomposed. The students place tiles on graph paper starting with one red tile, and filling the rest with blue tiles until they reach the goal number. Followed by starting with two red tiles and filling the rest with blue, etc..
- Student are successful doing the graph paper exercise with red and blue tiles can transfer this same process to the representational stage by doing the same process coloring in graph paper.
- One of the simplest strategies for differentiating instruction is allowing students to choose the numbers with which they will work.
- Use math journals for differentiation and formative assessment. Link shows one teachers experience <https://www.teachingchannel.org/videos/math-journals>
- Students who struggle with writing numbers in order can use a number line to support the accuracy of writing numbers in order.
- Teacher sharing videos of differentiated instruction for addition and subtraction in kindergarten. http://www.montgomeryschoolsmd.org/departments/development/resources/math_lab_laytonsvillees/index.shtm

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](#)
- [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

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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](#)

Strategies to Support English Learners

- [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

Students can decompose numbers, up to and including 10 and show all combinations can organized their combinations and describe any patterns they see. These students may also record the equations for each combination they make.

- What's the Question? Provide students with a number and they develop the questions. For example; The answer is 5. What is the question?

Interdisciplinary Connections

Children's Literature - * Bridges recommended titles

The Icky Bug Counting Book by Jerry Pallotta

Three-Dimensional Shapes by Stuart J. Murphy

**Cubes, Cones Cylinders and Spheres* by Tana Hoban

**The Three Dimensional Shapes...* by Luana Mitten

- Cubes
- Cones
- Cylinders
- Spheres

**Brown Rabbit's Shape Book* by Alan Baker

Count by Denise Fleming

How Do Dinosaurs Count by Jane Yolen

**A 3-D Birthday Party* by Ellen B. Senisi

**Captain Invincible and the Space Shapes: Three-Dimensional Shapes* by Stuart J. Murphy

ELA[SL.K.1](#)

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

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.
- Use quantitative data to compare two alternative solutions to a problem.