

Winchester Math Curriculum Grade K

Subject	Mathematics
Grade/Course	Kindergarten
Unit of Study	Unit 5- Two-Dimensional Geometry
Pacing	February
Unit Summary	Kindergarteners begin this unit by comparing a sphere and a circle, two shapes with which they are likely to be quite familiar. Students' comparisons bring to light the differences between three-dimensional shapes and two-dimensional shapes. After this initial investigation, students spend the rest of the unit examining, identifying, comparing, and sorting two-dimensional shapes. The Work Places in this unit invite students to construct and deconstruct a variety of shapes.

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.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.

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.G.B.6- Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

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

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.

“Unwrapped” Standards

Skills	Content
Count	<ul style="list-style-type: none"> by ones and tens to 100 forward from a number other than one the number of objects in a category
Write	<ul style="list-style-type: none"> numbers 0 to 20
Represent	<ul style="list-style-type: none"> number of objects with numeral
Identify	<ul style="list-style-type: none"> groups of objects greater than, less than, or equal to another group of objects shapes as two- or three-dimensional
Compare	<ul style="list-style-type: none"> two numbers from 1 to 10 as written numerals 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
Compose	<ul style="list-style-type: none"> simple shapes to form larger shapes
Classify	<ul style="list-style-type: none"> objects into categories
Sort	<ul style="list-style-type: none"> categories by count
Decompose	<ul style="list-style-type: none"> numbers in more than one way

Essential Questions

- How can you describe shapes and/or objects?
- How can you compare and/or sort shapes?
- How can you look for and make use of the structure of basic shapes to compose larger shapes more complex shapes?

Corresponding Big Ideas

- Shapes and objects can be described by attributes and relative location.
- Shapes can be compared and/or sorted by how they look, by similar/different properties such as; sides, corners, straight, curved, etc...
- Many shapes have similar attributes or structures and possible positions. The structures and positions of shapes can be viewed and used to figure out how to compose larger more complex shapes with similar attributes.

Evidence of Learning - Assessment

Pre/Post Assessment	Interim Assessment	Additional Evidence of Learning
	<ul style="list-style-type: none"> Sort & Count Checkpoint 	Options

	<p>Module 1, Session 4</p> <ul style="list-style-type: none"> • Two-Dimensional Shapes & Their Attributes Checkpoint <p>Module 3, Session 4</p>	<p>Observational Assessments</p> <ul style="list-style-type: none"> • Circles and Squares Race to Twenty - M1, S5 • Geoboard Shapes - M2, S5 • Shapes and Spinners Graphing, M3, S1 • Pattern Block Designs - M3, S2 • Spin and Count Shapes - M3, S3 • Hungry Caterpillars - M3, S5
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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 5 are:

Number Sense

- Counting
- Counting and comparing sets
- Using pennies and nickels to develop understanding of counting by 5s.
- Decomposing teen numbers
- Counting by 10s to 100
- Count and compare to 30

- Reading numbers to 20

Computational fluency

- represent and solve story problems to 10
- Solve story problems subtracting from 5

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

Module 1	Module 2	Module 3	Module 4
Problem + Investigation <ul style="list-style-type: none"> • Sessions 1-4 Work Place <ul style="list-style-type: none"> • Sessions 1-5 Assessment <ul style="list-style-type: none"> • Session 4 Home Connection <ul style="list-style-type: none"> • Sessions 2, 5 	Problem + Investigation <ul style="list-style-type: none"> • Sessions 1-5 Work Place <ul style="list-style-type: none"> • Sessions 1-5 Home Connection <ul style="list-style-type: none"> • Sessions 2, 5 	Problem + Investigation <ul style="list-style-type: none"> • Session 4 Work Place <ul style="list-style-type: none"> • Sessions 1-5 Assessment <ul style="list-style-type: none"> • Session 4 Home Connection <ul style="list-style-type: none"> • Sessions 2, 5 	Problem + Investigation <ul style="list-style-type: none"> • Sessions 2-5 Work Place <ul style="list-style-type: none"> • Sessions 1-5 Home Connection <ul style="list-style-type: none"> • Sessions 2, 5

Possible Misconceptions

1. When first learning about shapes, students may use informal names for shapes, such as calling a sphere a ball or a cube a box.
2. Students may incorrectly name the some shapes as triangles. These include a three-sided shape with a curved-side, a three-sided shape with a curved corner, etc.
3. Kindergarten students usually will not recognize a triangle that has been inverted or turned upside down. Students often say the inverted triangle does not look like a triangle. Students may decide to name a triangle based on perception, not reasoning.
4. Students may use incorrect terminology when describing shapes. For example, students may say a cube is a square).
5. Kindergarteners may not consider the properties of two-dimensional shapes and may believe the shapes below are rectangles.



6. Some students may confuse the name of a two-dimensional shape with a related three-dimensional shape or the shape of

Teacher Moves

1. Reinforce appropriate vocabulary by reminding students to use the correct mathematical name.
2. Provide a variety of shapes for students to discuss and sort. Talk about how students can recognize examples and non-examples of shapes in the environment.
3. Provide activities to talk about what a shape looks like and identify specific attributes that define a shape. Another way to address this misconception is to have students trace shapes.
4. Help students learn that the two-dimensional shape is a part of the object (e.g. a square is a face of a cube)
5. Numerous experiences and discussions using a variety of shapes can correct students misconception and assist them in learning to identify triangles and rectangles in any form, size, or orientation.
6. While exploring with two-dimensional flat shapes, start by using flat paper.

<p>its face. For example, calling a cube a square.</p> <p>7. Some students may be unable to visually see shapes from different perspectives and therefore struggle to “move” a shape by sliding, rotating, or flipping the shape to create another shape.</p>	<p>7. Demonstrate how to join the shapes together or how to fill in the outline of a shape picture with pattern blocks.</p>
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Vocabulary and Representations

Tier 2 (Academic Vocabulary)	Tier 3 (Domain Specific Vocabulary)
<p>add* objects</p> <p>addition* pattern*</p> <p>above problem</p> <p>attribute(s) rectangle*</p> <p>below round*</p> <p>beside shape(s)</p> <p>categories side</p> <p>circle* size</p> <p>classify small</p> <p>compare solid</p> <p>count sort*</p> <p>curved sphere</p> <p>describe square*</p> <p>equal to* straight</p> <p>estimate* strategies</p> <p>flat triangle*</p> <p>graph*</p> <p>greater than*</p> <p>identify</p> <p>large</p> <p>least</p> <p>length*</p> <p>less*</p> <p>less than*</p> <p>more</p> <p>most</p> <p>next to</p>	<p>compose shapes</p> <p>decompose numbers</p> <p>hexagon*</p> <p>rhombus*</p> <p>trapezoid</p> <p>two-dimensional shape (2-D)</p> <p>three-dimensional shape(3 -D)</p> <p>vertex/corner</p> <p> </p> <p>*Smarter Balanced Vocabulary is focused on major mathematical concepts. (Not all possible words have been identified by SBAC)</p> <p> </p> <p>+ Students are not responsible for these vocabulary words at this grade level, however they should have some understanding of the mathematical concept.</p>

1. **Bridges** - Reference Math Practices in Action Notes - The notes identify how particular mathematical practice is employed in a specific activity.
2. [Math Practices Teacher Question Starters](#)
3. [Implementing the Standards of Mathematics Practice](#)
4. [Illustrating the Standards of Mathematical Practice](#)
5. [Math Practice Posters K-1](#)
6. [K - Standards + Practices Explanations and Examples](#)
7. [Number Sense Trajectory](#)
8. [Number Talks Matter - Number Talks at a Glance](#) and Fluency without Fear
9. Teaching Channel - [Beyond Fingers; Place Value and Numbers 11-19](#)
10. [Early Mathematics - A Resource for Teaching Young Children Mathematics](#)
11. [Lessons for Learning](#) - A Collection of Math Tasks/Instructional Ideas
12. [Building Conceptual Understanding and Fluency Through Games](#)
13. [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.
14. [Cycle of Instruction in Geometry](#)
15. LearnZillion - Lesson Plans and Activities - None available at this time
16. [Illustrative Math – Grade K](#) - Resources and activities for the grade aligned by standard.
17. K-5 Math Teaching Resources
 - [Pattern Block Barrier Game](#)
 - [Geometry Sentence Frames](#)
 - [3-D Shape Book](#)
 - [Shapes on Geoboard](#)
 - [Playdough Shapes](#)

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](#))
 - Display numerous examples of rectangles, squares, circles, triangles, hexagons, cylinders, and spheres with different sizes and different orientations. Ask students to discuss and sort. Talk about how students can recognize examples and non-examples of shapes in the environment. Reinforce positional vocabulary to describe a shapes location.
 - Use crafts sticks, coffee stirrers, or q-tips and have students practice creating basic shapes,

- Have students line up in various shapes; i.e. circle, square, triangle, etc.
- Use the work place sentence frame cards to assist students in their discussions about shapes.
- As students discuss what they know and see about shapes, scaffold their responses by summarizing what they say and restate using mathematical language.
- Have visual representations of the shapes available for English learners.
- Students move slowly through the levels of geometric understanding and may need to spend more time at the early levels. Review Van Hiele Levels in unit overview.
- To develop an understanding of the difference between two- and three-dimensional shapes provide multiple opportunities for students to recognize the differences such as; between a circle and sphere, have several pictures of circles or use circular chips and compare to balls, marbles, etc.
- Use tens frames or muffin tins to assist students who are struggling with counting shapes. Students place one shape in a tens frame or in one muffin spot until collection is complete. Place each sorted collection different tens frame or muffin tins to assist student in counting and comparing the number of shapes.
- Provide visual representations of attributes related to specific shapes.
- 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.
- [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 as the discussion of how students obtained their answers as on the answers themselves.
- Having students work in groups (as opposed to handing your bright students a workbook to work on when the classroom material isn't challenging enough) with other children ready for advanced material shows them that mathematics is not a solitary discipline -- mathematics is

exciting and vibrant and creative and fun.

- [Concrete, Representational, Abstract Progression](#)
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- 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

- Students can play the pattern block game with a partner. Place a divider between two students sitting across from each other. Student one will create a design with blocks without letting the partner see it and then tell the partner how to place the pattern blocks to match the created design. Student one will use positional words to describe block placement. Take away the divider. Look at both designs to see if they match. Student two takes a turn.
- Challenge students to see if they can use one pattern block to make another pattern block shape.
- Ask students to find out how many more shapes would be needed to reach a given number.
- Have students write inequality statements for how many more of one shape there are than another.
- Students can write equations that reflect the number of shapes in the Spin and Count Shapes Activity.
- Provide student with a number line to help determine the numbers.

Interdisciplinary Connections

Children's Literature

The Boy and the Quilt by Shirley Kurtz

Circus Shapes by Stuart J. Murphy

The Greedy Triangle by Marilyn Burns

Shapes, Shapes, Shapes by Tana Hoban

Square Cat by Elizabeth Schoonmaker

Round is a Mooncake by Roseanne Thong

Art

Create a shapes collage.

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

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