TRUMBULL PUBLIC SCHOOLS
Trumbull, Connecticut

Mathematics

Kindergarten

2014
(Last revision date: 2005)

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Kindergarten Mathematics

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The Trumbull Board of Education, as a matter of policy, prohibits discrimination on the grounds of age, creed, religion, sex, race, color, handicap, political affiliation, marital status, sexual orientation, or national origin.

CORE VALUES AND BELIEFS

The Trumbull Public Schools Community, which engages in an environment conducive to learning, believes that all students will read and write effectively, therefore communicating in an articulate and coherent manner. All students will participate in activities that address problem-solving through critical thinking. Students will use technology as a tool in decision making. We believe that by fostering self-confidence, self-directed and student-centered activities, we will encourage independent thinking and learning. We believe ethical conduct to be paramount in sustaining our welcoming school climate.

INTRODUCTION

The Elementary Math Curriculum was last revised in 2005 and was aligned to the CT Frameworks for Mathematics. In 2010 the State of Connecticut adopted the Common Core State Standards (CCSS) prompting all Connecticut schools to use these standards to guide instruction. This curriculum guide reflects the necessary changes to our curriculum for alignment with the CCSS. It also includes specific grade level expectations and resources appropriate for this grade, making it a truly teacher-friendly instructional guide for ease in delivery. Appropriate professional development will further aid in fidelity to the implementation of the CCSS and assured use of the resources provided for instruction.

Please note: Minor adjustments to this curriculum guide may be necessary to adhere to the CCSS. As additional state and national resources are shared, the district will add essential information to this document.

PHILOSOPHY

Success in mathematics depends upon active involvement in a variety of interrelated experiences. When students participate in stimulating learning opportunities, they can reach their full potential.

The Trumbull Mathematics Program embraces these goals for all students.

The successful mathematician will:

- Acquire the factual knowledge necessary to solve problems
- Gain procedural proficiency in problem solving
- Demonstrate a perceptual understanding of problems posed
- Make meaningful mathematical connections to their world
- Solve problems utilizing a variety of strategies
- Utilize technology to improve the quality of the problem solving process
- Communicate effectively using mathematical terminology, both independently and collaboratively
- Use sound mathematical reasoning by utilizing the power of conjecture and proof in their thinking
- Become reflective thinkers through continuous self evaluation
- Become independent, self motivated, lifelong learners

The Trumbull Mathematics Program promotes the empowerment of students and encourages students to embrace the skills needed to become successful in the 21st century. Students expand their mathematical abilities by investigating real world phenomena. Through such experiences, students can access the beauty and power of mathematics and truly appreciate the impact it has on the world in which they live.

Developed by Trumbull K-12 Math Committee, June 2004; revised and approved April 2011

COURSE DESCRIPTION

In Kindergarten, instructional time should focus on two critical areas:

1. *Represent and compare whole numbers, initially with sets of objects*
2. *Describe shapes and space*

GOALS: Major Focus Areas for Kindergarten Mathematics

1. ***Representing and comparing whole numbers, initially with sets of objects***

    Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 - 2 = 5$. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

2. ***Describing shapes and space***

    Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Kindergarten Mathematics: Trimester 1 (60 days)

Unit Name: Kindergarten Trimester 1

Content and Skills

Mathematical Practices: See Addendum for Mathematical Practices Poster

Counting and Cardinality:
- Knows number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Quantity, Measurement, and Data:
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.

Geometry:
- Identify and describe shapes.

Essential Question(s): Taken from the CCSS Mathematical Practices
- What is the problem asking? Does this make sense? (MP1)
- Can I clearly explain my reasoning? Can I understand the reasoning of others? Do I agree or disagree? (MP3)
- Can I model my thinking using manipulatives, words, numbers or pictures? (MP4)
- Is my answer correct? How can I prove it mathematically? (MP6 and 7)

Focus Question(s): These will be content specific (i.e. Explain how you arrived at an answer)
- Can you solve using a different strategy?
- Can you critique or agree with another person's strategy?

Common Core State Standards for Mathematics *(See Appendix for complete description)*		Time Allotment	Assured Learner Activities		Assessment
K.CC.1 K.CC.3 K.CC.4 K.CC.5 K.CC.6 K.CC.7	K.MD.1 K.MD.2 K.MD.3 K.G.1 K.G.2	70 minutes daily per Trumbull Board of Education Policy # 6112.2	▪ Daily Classroom Routines -Attendance -Calendar -Today's Question *Directions provided for all Classroom Routines and games found in text. See resources	▪ Investigations in Number, Data, and Space © 2007 and 2010 Addendum ▪ Everyday Counts Calendar Math	▪ Baseline Assessments ▪ Classroom mathematical discourse ▪ Class at a Glance spreadsheet
Technology Competency Standards *(See Appendix for complete description)* 2. Communicate and Collaborate 5. Digital Citizenship					

Kindergarten Mathematics: Trimester 2 (60 Days)

Unit Name: Kindergarten Mathematics: Trimester 2

Content and Skills

Mathematical Practices: See Addendum for Mathematical Practices Poster

Counting and Cardinality:
- Knows number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Numeration, Operations, and Algebraic Thinking:

Operations and Algebraic Thinking
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Quantity, Measurement, and Data:
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.

Geometry:
- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

Essential Question(s): Taken from the CCSS Mathematical Practices
- What is the problem asking? Does this make sense? (MP1)
- Can I clearly explain my reasoning? Can I understand the reasoning of others? Do I agree or disagree? (MP3)
- Can I model my thinking using manipulatives, words, numbers or pictures? (MP4)
- What patterns do I see in Quick Images? (MP6 and 7)

Focus Question(s): These will be content specific (i.e. Explain how you arrived at an answer)
- Can you solve using a different strategy?
- Can you critique or agree with another person's strategy?

Common Core State Standards for Mathematics *(See Appendix for complete description)*		Time Allotment	Assured Learner Activities		Assessment
K.CC.1 K.CC.2 K.CC.3 K.CC.4 K.CC.5 K.CC.6 K.CC.7 K.OA.1 K.OA.2 K.OA.3	K.OA.4 K.MD.1 K.MD.2 K.MD.3 K.G.1 K.G.2 K.G.3 K.G.4 K.G.5 K.G.6	70 minutes daily per Trumbull Board of Education Policy # 6112.2	▪ Daily Classroom Routines -Attendance -Calendar -Today's Question -Patterns in Pocket Charts *Directions provided for all Classroom Routines and games found in text. See resources	▪ Investigations in Number, Data, and Space © 2007 and 2010 Addendum ▪ Everyday Counts Calendar Math ▪ Basic Facts to 5: Practice with flashcards	▪ Baseline: Mid-year Assessment ▪ Classroom mathematical discourse ▪ Class at a Glance spreadsheet
Technology Competency Standards *(See Appendix for complete description)* 2. Communicate and Collaborate 5. Digital Citizenship					

Kindergarten Mathematics: Trimester 3 (61 Days)

Unit Name: Kindergarten Mathematics: Trimester 3

Content and Skills

Mathematical Practices: See Addendum for Mathematical Practices Poster

Counting and Cardinality:
- Knows number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Numeration, Operations, and Algebraic Thinking:

Operations and Algebraic Thinking
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten
- Work with numbers 11-19 to gain familiarity for place value.

Quantity, Measurement, and Data:
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.

Geometry:
- N/A

Essential Question(s): Taken from the CCSS Mathematical Practices
- What is the problem asking? Does this make sense? (MP1)
- Can I clearly explain my reasoning? Can I understand the reasoning of others? Do I agree or disagree? (MP3)
- Can I model my thinking using manipulatives, words, numbers or pictures? (MP4)
- What patterns do I see in Quick Images? (MP6 and 7)

Focus Question(s): These will be content specific (i.e. Explain how you arrived at an answer)
- Can you solve using a different strategy?
- Can you critique or agree with another person's strategy?

Common Core State Standards for Mathematics *(See Appendix for complete description)*	Time Allotment	Assured Learner Activities		Assessment
K.CC.1 K.OA.2 K.CC.2 K.OA.3 K.CC.3 K.OA.4 K.CC.4 K.OA.5 K.CC.5 K.NBT.1 K.CC.6 K.MD.1 K.CC.7 K.MD.3 K.OA.1 **Technology Competency Standards** *(See Appendix for complete description)* 2. Communicate and Collaborate 5. Digital Citizenship	70 minutes daily per Trumbull Board of Education Policy # 6112.2	▪ Daily Classroom Routines -Attendance -Calendar -Today's Question -Patterns in Pocket Charts -Counting on Number Line *Directions provided for all Classroom Routines and games found in text. See resources	▪ Investigations in Number, Data, and Space © 2007 and 2010 Addendum ▪ Everyday Counts Calendar Math ▪ Basic Facts to 5: Practice with flashcards	▪ Baseline: Post Assessment ▪ Classroom mathematical discourse ▪ Class at a Glance spreadsheet

Instructional/Teaching Strategies

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

Brainstorming; Classroom Discourse; Computational Fact Fluency Practice; Daily Classroom Routines; Model Instruction; Small Group Instruction; Whole Class Instruction; Peer Modeling; Problem Solving Strategies; Mathematical Vocabulary Walls; Math Journals; Word Problem Interpretation and Creation; Use Technology to Solve Problems; Question and Answer Sessions; Refocus Students; Flexible Grouping; Ten-Minute-Math; Use Graphic Organizers; Use Math Games; Identify Similarities and Differences, Note Taking, and Wait Time.

TEXTS

Title	Author	Publisher	Date of Publication
Investigations In Number, Data, and Space	▪ *TERC, Cambridge, MA* ▪ Pearson Publishing ▪ National Science Foundation	*Pearson*	*2007*
Investigations and the Common Core Standards	▪ *TERC, Cambridge, MA* ▪ Pearson Publishing ▪ National Science Foundation	*Pearson*	*2012*

SUPPLEMENTARY MATERIALS/ RESOURCES/ TECHNOLOGY

Supplementary Materials:

Manipulatives provided for each Kindergarten classroom.

- Investigations Card Kits

- Manipulative Materials

  - Attribute Blocks
  - Balance Scales
  - Calendar
  - 1 Inch color tiles
  - 2-color counters
  - Dice
  - Geoboards
  - Geoblocks
  - Geometric solids
  - Hundred number chart
  - Number cubes
  - Number line
  - Pattern blocks
  - Snap or Unifix cubes
  - Teddy Bear counters

Resources:

Everyday Counts Calendar Math	*Janet Gillespie Patsy F. Kanter*	*Great Source*	*2005*
Showing and Telling Packet	*District Created*		
Basic Fact Practice	*District Created*		

Websites:

- **Connecticut Core Standards for Mathematics:**
  http://www.corestandards.org/Math

- **Extra Math**: http://xtramath.org

- **Learn Zillions:** http://learnzillion.com

- **National Council of Teachers of Mathematics:** www.nctm.org

- **National Library of Virtual Manipulatives:** http://nlvm.usu.edu

- **NCTM Illuminations:** www.illuminations.nctm.org

- **Pearson Successnet:** www.pearsonsuccessnet.com

- **Smarter Balanced Assessment Consortium:**
  http://www.smarterbalanced.org/

Kindergarten Vocabulary:

Above	**Fewer**	**Ones**	**Thirteen**
Add	**Fifteen**	**Plus**	**Three**
Addend	**Fifth**	**Quantity**	**Three-dimensional**
Alike	**Fifty**	**Rectangle**	**shape**
And	**First**	**Roll**	**Triangle**
Attribute	**Five**	**Row**	**Twelve**
Behind	**Flat**	**Same**	**Twenty**
Below	**Flat surface**	**Same height**	**Two**
Beside	**Four**	**Same length**	**Two-dimensional**
Between	**Fourteen**	**Same number**	**shape**
Bigger	**Fourth**	**Same weight**	**Vertex**
By	**Graph**	**Second**	**Vertices**
Category	**Greater than**	**Seven**	**Week**
Circle	**Heavier**	**Seventeen**	**Weight**
Classify	**Height**	**Shape**	**Zero**
Compare	**Hexagon**	**Shorter**	
Compose	**Hundred**	**Side**	
Cone	**In front of**	**Sides of equal length**	
Count	**Larger**	**Six**	
Count on	**Length**	**Sixteen**	
Cube	**Less**	**Size**	
Curve	**Less than**	**Slide**	
Curved surface	**Lighter**	**Smaller**	
Cylinder	**Longer**	**Solid shape**	
Data	**Make ten**	**Sort**	
Day	**Match**	**Sphere**	
Decompose	**Minus**	**Square**	
Difference	**More**	**Stack**	
Different	**Next to**	**Subtract**	
Digit	**Nine**	**Sum**	
Eight	**Nineteen**	**Take away**	
Eighteen	**Number**	**Taller**	
Eleven	**Number pair**	**Ten**	
Equal	**Numeral**	**Tens**	
Equation	**Object**	**Third**	
Expression	**One**		

Adapted from Granite Public Schools, Granite, Colorado

RUBRICS

Kindergarten Class at a Glance Spreadsheet and Rubric (Teacher Only Appendix)

RESOURCE FILE/ APPENDICES

- *Connecticut Core State Standards for Mathematics*
- *Mathematical Practices Poster*
- *Technology Competency Standards*
- *Kindergarten Report Card*
- *Kindergarten Pacing Guides*
- *Kindergarten Parent Report Card Companion*

CURRENT REFERENCES

Common Core State Standards for Mathematics
www.corestandards.org

International Society for Technology in Education
www.iste.org/STANDARDS

National Council of Teachers of Mathematics
www.nctm.org

Connecticut's Common Core Standards

Mathematics – Kindergarten Standards

Know number names and the count sequence.

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).

Counting to tell the number of objects.

K.CC.B.4: Understand the relationship between numbers and quantities; connect counting to cardinality.

    a. 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.

    b. 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.

    c. 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.

Comparing numbers.

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. (Note: Include groups with up to ten objects.)

K.CC.C.7: Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking

Understanding addition as putting together and adding to, and understanding subtraction as taking apart and taking from.

K.OA.A.1:Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem -- this applies wherever drawings are mentioned in the Standards.)

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.A.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.A.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.A.5:Fluently add and subtract within 5.

Number and Operations in Base Ten

Working with numbers 11 – 19 to gain foundations for place value.

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 (e.g., $18 = 10 +8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Describe and compare measurable attributes.

K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.A.2: Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Classify objects and count the number of objects in each category.

K.MD.B.3: Classify objects or people into given categories; count the numbers in each category and sort the categories by count. (Note: Limit category counts to be less than or equal to 10.)

Geometry

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

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").

Analyze, compare, create, and compose shapes.

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?"*

CCSS Mathematical Practices

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Technology Competency Standards

1. Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

2. Communication and Collaboration - Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

3. Research and Information Fluency - Students apply digital tools to gather, evaluate, and use information.

4. Critical Thinking, Problem Solving, and Decision Making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

5. Digital Citizenship - Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

6. Technology operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.