

## UNIT 6 THINGS THAT GROW

### Enduring Understandings used in Math Components

- Living things need food, water and proper conditions to survive and thrive
- Living things are part of interdependent systems.
- Living things grow and have life cycles.

### Essential Questions used in Math Components

- How do living things respond and adapt to their environments?
- What do systems need in order to function successfully?

### Guiding Math Ideas

- Empowering Mathematical Thinking- Habits of Mind for School Success: Perseverance and Process
- Review and Reinforcement of Counting Strategies - Counting On and Counting Back
- Review and Reinforcement: Quantity
- Beginning Operations: Adding and Subtracting through Representation (manipulatives and symbols)
- Patterns- Extension and Creation
- Manipulating shapes
- Measurement and Geometry as Practical and Purposeful: Measurable Attributes of Things that Grow

Where's the Math?

Teacher Supports for Unit Concepts

- Empowering Young Mathematicians: Habits of Mind for School Success

### UNIT 6- MATH IDEAS BY THE WEEK- LINKS TO THEME

WEEK 1	WEEK 2	WEEK 3	WEEK 4	Week 5 AND Additional School Weeks
<p>Guiding Math Ideas: Manipulating Shapes and Patterns</p> <p>Link to theme: Investigating elements of nature/gardening</p>	<p>Guiding Math Idea: Review and Reinforcement of Counting Strategies and Quantity; Beginning Operations</p> <p>Link to theme: What living things need to survive</p>	<p>Guiding Math Ideas: Measurement and Geometry are Practical and Purposeful</p> <p>Link to theme: How do living things adapt to their environments?</p>	<p>Guiding Math idea: Extending and Creating Patterns</p> <p>Link to Theme: Living things grow and have life cycles</p>	<p>Guiding Math Idea: Empowering Mathematical Thinking: Problem Solving</p> <p>Link to theme: Solving a problem takes an interdependent system.</p>

MATH FOR ME- SCOPE AND SEQUENCE OF MATH CONTENT AND CONCEPT LEARNING PROGRESSIONS

CORE CONSTRUCT = THE OVERALL GOAL FOR THE YEAR THAT APPLIES TO ALL UNITS

UNIT 6-HIGHLIGHTED

MELDS COMPONENT CORE CONSTRUCT Concept	UNIT 1 FAMILY	UNIT 2 FRIENDS	UNIT 3 WIND & WATER	UNIT 4 WORLD OF COLOR	UNIT 5 SHADOWS AND REFLECTIONS	UNIT 6 THINGS THAT GROW
<b>MATHEMATICAL PRACTICES</b> CHILDREN ARE COMPETENT MATHEMATICIANS Attitudes/Approach	Learning math starts with discovery and exploration.	Participating in Math Activities with friends.	Using math to observe the weather.	Playing games = engaging with math concepts & skills.	Science and math concepts help us understand shadows.	Math is energizing and useful in many contexts: school, home, and the surrounding environment.
<b>Usefulness (Mathematizing)</b>	We use math every day: Connecting number to real world situations.	Math in our Classroom- Routines and activities	Math helps us describe and make sense of the physical world.	Math ideas relate to games and outdoor play (comparisons, quantity, subitizing)	Math is embedded in learning projects (Uses math in STEM activities)	
<b>Problem Solving</b> MATH HELPS SOLVE PROBLEMS	What is a problem? Introducing math into problem solving.	People work together to solve math problems	Gathering Information (data) to help solve problems	Finding patterns in data to help solve problems.	Generating and testing solutions to problems [STEM]	Solving practical problems using geometry and measurement data: Planning a garden.
<b>Communication (Mathematizing)</b> MATH = COMMUNICATION	Naming our math center and math activities	Math has special vocabulary. (e.g. 3D and 2D shapes/comparison words)	Math words and math ideas appear in storybooks, outdoors and home.	Identifying math words and math ideas that appear in storybooks, outdoors and home: subitizing, patterns, etc.	Growing accuracy and expanding use of language of math (verbal and non-verbal).	Applying the many “languages” of math in multiple contexts.
MELDS COMPONENT CORE CONSTRUCT Concept	UNIT 1 FAMILY	UNIT 2 FRIENDS	UNIT 3 WIND & WATER	UNIT 4 WORLD OF COLOR	UNIT 5 SHADOWS AND REFLECTIONS	UNIT 6 THINGS THAT GROW

<p><b>COUNTING &amp; CARDINALITY CLUSTER</b>  <b>COUNTING DETERMINES QUANTITY</b>  <b>Counting</b>  <b>Rote &amp; Rational</b></p>	<p>Practicing the number word list through words &amp; action.</p>	<p>Practicing the number word list through words &amp; action.   Transition from rote to rational counting strategies: One object has only one name</p>	<p>Rote Counting Strategies: Numbers have an order. Correcting errors.   Transition from rote to rational counting strategies: Counting dissimilar objects</p>	<p>Rote: Expanding the number word list to 20 and beyond.   Transition from rote to rational counting counting Strategies; Connecting groups to number names</p>	<p>Rote Counting Strategies: Finding patterns in counting above 10.   Transition from rote to rational counting strategies– Order irrelevance; Keeping track of numbers counted</p>	<p>Counting the same group of objects results in the same result. [Stability of sets and/or order irrelevance]   Using and applying rational counting to questions of quantity</p>
<p><b>Numerals</b>  <b>NUMERALS AND MATH SYMBOLS REPRESENT MATH IDEAS</b></p>	<p>Some writing marks are called numbers (numerals) and others are letters.</p>	<p>Identifying/naming number symbols in the environment.</p>	<p>Matching numerals with their names (0-5). Exploring writing numerals</p>	<p>Matches numerals with their names (0-10). Exploring Writing numerals with intent.</p>	<p>Writing number symbols up to 10.</p>	<p>We communicate math ideas using number symbols.</p>
<p><b>Cardinality</b>  <b>SEEING, SAYING AND REPRESENTING CARDINALITY INVOLVES MULTIPLE CONCEPTS.</b>  <b>Subitizing</b></p>	<p>Grouping objects of 1 or 2 (arbitrary or attribute-based)</p>	<p>Grouping of objects and describing likes and differences</p>	<p>“Seeing” groups of numbers automatically up to 5. (perceptual subitizing)</p>	<p>“Seeing” groups (up to 5) and sometimes using them as a counting strategy</p>	<p>Exploring the “5” group in activities.</p>	<p>Relating counting and cardinality with increasing accuracy: labeling groups with various arrangements/arrays.</p>
<p><b>Cardinality</b></p>		<p>Using a number word or some form of Counting to answer <i>How Many?</i></p>	<p>Counting groups of objects or persons and assigns a number name (1-2)</p>	<p>Counting groups of objects or persons and assigns a number name (Increasing accuracy)</p>	<p>Showing understanding that <i>How many</i> means the last number counted and represents the amount in the entire group.</p>	
<p><b>MELDS COMPONENT</b>  <b>CORE CONSTRUCT</b>  <b>Concept</b></p>	<p>UNIT 1  FAMILY</p>	<p>UNIT 2 FRIENDS</p>	<p>UNIT 3  WIND &amp; WATER</p>	<p>UNIT 4  WORLD OF COLOR</p>	<p>UNIT 5  SHADOWS AND REFLECTIONS</p>	<p>UNIT 6  THINGS THAT GROW</p>
<p><b>OPERATIONS AND ALGEBRAIC THINKING</b>  <b>Quantity</b></p>	<p>Introducing Number Questions</p>	<p>Responding to Number Questions with Demonstration or Words.(1, 2)</p>	<p>Beginning to count from 1 onward when asked how</p>	<p>Showing understanding that <i>How many</i> means the last number counted</p>	<p>Showing understanding that <i>How many</i> means the last number</p>	<p>Combining ideas of 1:1 correspondence, cardinality and</p>

<b>DETERMINING HOW MANY? IS THE GOAL OF EARLY MATH</b>			many. Gives an answer. Number words refer to quantity.	represents the entire group.	counted represents amount in entire group.	number stability to understand quantity. Experimenting with equivalencies
<b>Relationships MATH = FINDING RELATIONSHIPS AND PATTERNS. 1:1 Correspondence &amp; Other math relationships ( &lt; &gt; + - = )</b>	Demonstrating perceptive (intuitive) number in play or other daily activities	1:1 Correspondence is a special type of relationship—one name, one object. (See rational counting)	Beginning comparison of groups for more or less (visual estimating/ counting).	Beginning to compare groups using counting strategies ( up to 10).  Beginning to recognize parts/wholes of number groups.	Counts groups and begins to compare numbers(< > + = ) (up to 10)  Finding number partners: number within numbers (up to 5).	Comparing groups of numbers (< > + - = ) using word, actions or objects.  Beginning to compose/decompose numbers (up to 5)
<b>Representation MATH IDEAS APPEAR IN MANY MODES AND CONTEXTS. Physical/verbal Modeling</b>	Objects can represent other objects.	Representing number with words signs or gestures.	Number can be represented by manipulatives (unit blocks, counters) and symbols and people.	Drawing, describing or showing with manipulatives how number names relate to groups.	Beginning concepts of Adding and Taking (up to 5) Away (varying ways of representing)	Communicating addition and subtraction with fingers and manipulatives. (up to 5)
<b>Visual Tools for Representing Number &amp; Relationships</b>		Exploring number matching puzzles and manipulatives to represent relationships	Using number matching puzzles and manipulatives to represent relationships	Introducing number paths. Identifying a story problem.	Using number paths and grid games as a counting tool. Using story problems to visualize operations	Beginning to use number paths and grid games to communicate math ideas. Acting out story problems to visualize operations up to 10.
<b>MELDS COMPONENT CORE CONSTRUCT Concept</b>	<b>UNIT 1 FAMILY</b>	<b>UNIT 2 FRIENDS</b>	<b>UNIT 3 WIND &amp; WATER</b>	<b>UNIT 4 WORLD OF COLOR</b>	<b>UNIT 5 SHADOWS AND REFLECTIONS</b>	<b>UNIT 6 THINGS THAT GROW</b>
<b>GEOMETRY (INCLUDES CLASSIFICATION) FORMING AND APPLYING IDEAS OF SHAPES AND SPATIAL RELATIONSHIPS</b>	Manipulating and building with 3-D Shapes	Finding 3-D and 2-D shapes in the environment and	3D and 2D shapes have different attributes and uses.	Classifying shapes by describing and	Copies or represents shapes using	Growing accuracy in discovering, describing and

<b>Shape 3D-2D Attributes</b>		using words to describe geometrical figures.	Discovering and describing some attributes of shapes.	comparing some attributes.	manipulatives or drawing.	comparing attributes of shape: Exploring grouping shapes by characteristics.
<b>Parts/Wholes</b>  <b>COMPOSING &amp; DECOMPOSING FIGURES</b>	Taking apart and putting together toys, puzzles & manipulatives	Taking apart and putting together toys, puzzles and manipulatives and sometimes describing parts and wholes	Identifying the parts of objects in the classroom and outside world and relating those parts to whole.	Using shape puzzles and shape manipulatives for parts/whole understandings	Putting a variety of shapes together to make objects or pictures. Identifying words for part/whole concepts.	Taking apart shapes and reassembling. May identify parts. Applying part/whole understandings to the natural world.
<b>Space (Spatial relations)</b>  <b>Orientation Directionality</b>	Informal spatial movement: Moving our bodies in many different directions	Recognizing and responding to Directionality and Orientation words or commands	Moving objects and our bodies and describing relative positions in space. (Movement patterns or models such as maps)	Playing games and initiating activities that involve directionality and orientation.	Orientation: Shapes are still the same shape, despite their orientation (Intro to slides, flips and turns). Identifying shape and space concepts in STEM activities	Orientation: Manipulating and describing 2-D Shapes by Slides flips and turns  Integrating shape and space concepts in class projects and problem solving.
<b>MELDS COMPONENT</b> <b>CORE CONSTRUCT</b> <b>Concept</b>	<b>UNIT 1 FAMILY</b>	<b>UNIT 2 FRIENDS</b>	<b>UNIT 3 WIND &amp; WATER</b>	<b>UNIT 4 WORLD OF COLOR</b>	<b>UNIT 5 SHADOWS AND REFLECTIONS</b>	<b>UNIT 6 THINGS THAT GROW</b>
<b>MEASUREMENT &amp; DATA</b> <b>(INCLUDES CLASSIFICATION AND PATTERNS)</b> <b>FINDING MEASURABLE PROPERTIES AND EXPLORING MEASUREMENT METHODS</b> <b>Measurement Tools</b>		Exploring measurement tools indoors and outdoors.	Matching measurement tools to their purposes: measuring water; temperature	Mixing and creating colors using measurement tools.	Using tools to measure and compare shadows.	. Solving problems using some form of measurement method and tools.  Completing, extending and describing patterns.
<b>Measurement Methods &amp; Attributes</b>		Exploring and describing Measurable Attributes in everyday activities.	Experimenting with measurement: Directly comparing 2 or more items on an attribute.	Experimenting with measurement methods	Experimenting with measurement methods Non-standard measurement	

				Using measurable attributes to organize materials.		
<p><b>Specific Language &amp; Concepts</b></p> <p><b>PRACTICAL APPLICATION OF MEASUREMENT</b></p>	Everyday use of measurement words in play, at school and at home.	Growing use of accurate measurement terms: Exploring the Language of Time in classroom routines	Growing use of accurate measurement terms: Exploring temperature and capacity/volume	Growing use of accurate measurement terms: Exploring weight and mass. Describing past, present and future events.	Growing use of accurate measurement terms: Exploring length and distance: Continuous and discrete measurement	Demonstrating the practical use of measurement (including data skills) to solve problems in everyday life
<p><b>Data</b></p> <p><b>GATHERING, ORGANIZING AND USING INFORMATION TO MAKE MEANING AND SOLVE PROBLEMS</b></p>	Matching and, grouping (Attribute recognition)	Describing, sorting and classifying collections (Self-described or in response to questions)	Growing use of discrete attributes for classification/sorting strategies to organize collections of things. Discovering patterns in movement song or materials.	Organizing data: Recording data graphically in charts & graphs. Describing patterns.	Growing abilities to recognize, copy describe and create patterns.	

# UNIT 6- THINGS THAT GROW

## Sequence of MELDS Standards

<b>1</b>		<b>2</b>		<b>3</b>		<b>4</b>
<b>End of Toddler Guidelines- 36 months-3 years</b>		<b>MATHEMATICAL PRACTICES</b>		<b>End of Preschool Standards- 60 Months-5 years</b>		<b>Maine Learning Results – End of Kindergarten Standards</b>
<p><b>NO TODDLERS GUIDELINES ARE EMBEDDED IN THIS UNIT. TEACHERS WILL CONTINUE TO USE THE PREVIOUS SELECTED STANDARDS AS NEEDED TO MEET CHILDREN'S LEARNING PROGRESSIONS</b></p>		<p><b>COUNTING AND CARDINALITY CLUSTER</b></p>	<p><b>MATHEMATICAL PRACTICES</b></p> <ul style="list-style-type: none"> <li>Uses math terms in the course of everyday conversations.</li> <li>Uses math to solve problems in the context of classroom and home experiences</li> </ul> <p><b>COUNTING AND CARDINALITY CLUSTER</b></p> <ul style="list-style-type: none"> <li>Rote counts to 20 and beyond by ones with increasing accuracy</li> <li>Recognizes and names written numerals 0-10</li> </ul>	<p><b>SELECTED END OF KINDERGARTEN STANDARDS ARE EMBEDDED IN THIS UNIT AS EXAMPLES OF PLANNING FOR CHILDREN'S GROWING MATHEMATICAL ABILITIES</b></p> <p><b>MATHEMATICAL PRACTICES</b></p> <p><b>MAKING SENSE OF PROBLEMS</b></p> <ul style="list-style-type: none"> <li>Perseveres in solving problems</li> <li>Models with mathematics</li> </ul> <p><b>COUNTING AND CARDINALITY CLUSTER</b></p>		<p><b>SELECTIONS FROM THE MAINE LEARNING RESULTS – END OF KINDERGARTEN STANDARDS</b></p>

	<p><b>OPERATIONS AND ALGEBRAIC THINKING</b></p> <p>Transitions from rote counting to 1:1 correspondence</p>	<p>Subitizes to determine how many (recognizes small quantities immediately)</p> <p>Recognizes the relationship between numbers and quantities: connecting counting to cardinality (0-10)</p> <p>Shows understanding that the last number name spoken tells the number of objects counted up to 10 (cardinality)</p> <p>Shows understanding that the number of objects is the same regardless of their arrangement or the order in which they were counted.</p> <p>Begins to write number symbols 0-10</p> <p>Identifies whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group up to 10.</p> <p><b>OPERATIONS AND ALGEBRAIC THINKING</b></p> <p>Associates quantity with a number name or a written symbol</p> <p>Counts using 1:1 correspondence with increasing accuracy.</p>	<p>Counts to answer “how many” questions, with as many as 10 things arranged in a line, rectangular array or a circle, or as many as 5 things in a scattered configuration; given a number from 1010, count outs that many objects.</p> <p><b>OPERATIONS AND ALGEBRAIC THINKING</b></p>
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	<p><b>GEOMETRY</b> (Shape concepts)</p> <p>Uses puzzles and other learning materials to demonstrate beginning part/whole, shape and orientation concepts to solve problems.</p> <p>(Space concepts)</p>	<p>Represents mathematical concepts using manipulatives</p> <p>Represents addition and subtraction with fingers, drawing, acting out situation and verbal explanation.</p> <p>Uses concrete objects to model real-world addition and subtraction up to 5 (composing and decomposing numbers)</p> <p>Acts out and solves story problems using sets of up to ten objects.</p> <p><b>GEOMETRY</b> (Shape concepts)</p> <p>Describes sorts and classifies shapes using some attributes such as size, sides and other properties</p> <p>Discovers connections between formal geometric shapes and the surrounding environment</p> <p>Breaks down shapes into parts and wholes.</p> <p>(Space concepts) Initiates activities that indicate an understanding of directionality</p>	<p>Understands addition as putting together and adding to, and understands subtractions as taking apart and taking from.</p> <p><b>GEOMETRY</b> (Shape concepts)</p> <p>Identifies shapes as two-dimension (lying in a plane, “flat”) or three-dimensional (“solid”)</p>
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	<p><b>MEASUREMENT AND DATA</b>  <b>Recognizes and duplicates simple patterns in the environment, including sound and movement patterns.</b></p>	<p><b>Uses symbols and/or objects to indicate beginning understanding of relative positions in space (e.g. creates simple maps; follows directions during nature walks.</b>  <b>Uses orientation and directionality words such as slides, flips and turns as shapes are manipulated.</b>  <b>MEASUREMENT AND DATA</b>  <b>Recognizes, duplicates, creates and extends simple patterns using objects.</b>  <b>Describes, sorts and classifies groups of objects using one or more attribute.</b>  <b>Recognizes measurable attributes of objects such as length, weight and capacity of everyday objects (e.g. long, short, tall, heavy, light, big, small full, empty)</b>  <b>Responds to questions that can be answered through data analysis.</b>  <b>Represents data using simple charts and graphs (2-D or 3D).</b>  <b>Uses non-standard units of measurement to measure objects; notices similarities and differences.</b>  <b>Connect measurement terms and concepts in everyday life.</b></p>	<p><b>Describe relation positions of objects in the environment using terms such as above, below, beside, in front of, behind and next to</b>  <b>MEASUREMENT AND DATA</b></p> <p><b>Classifies objects into given categories; count the number of objects in each category and sort the categories and count.</b></p>
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