

# COURSE: Math

## Grade Level: First

**Process Strands:** The process strands (Problem Solving, Reasoning and Proof, Communication, Connections, and Representation) highlight ways of acquiring and using content knowledge. These process strands help to give meaning to mathematics and help students to see mathematics as a discipline rather than a set of isolated skills. Student engagement in mathematical content is accomplished through these process strands. Students will gain a better understanding of mathematics and have longer retention of mathematical knowledge as they solve problems, reason mathematically, prove mathematical relationships, participate in mathematical discourse, make mathematical connections, and model and represent mathematical ideas in a variety of ways.

<p>Problem Solving Strand</p>	<p><b>Students will build new mathematical knowledge through problem solving.</b></p> <ul style="list-style-type: none"> <li>• Explore, examine, and make observations about a social problem or mathematical situation</li> <li>• Interpret information correctly, identify the problem, and generate possible solutions</li> </ul> <p><b>Students will solve problems that arise in mathematics and in other contexts.</b></p> <ul style="list-style-type: none"> <li>• Act out or model with manipulatives activities involving mathematical content from literature and/or story telling</li> <li>• Formulate problems and solutions from everyday situations (e.g., counting the number of children in the class or using the calendar to teach counting)</li> </ul> <p><b>Students will apply and adapt a variety of appropriate strategies to solve problems.</b></p> <ul style="list-style-type: none"> <li>• Use informal counting strategies to find solutions</li> <li>• Experience teacher-directed questioning process to understand problems</li> <li>• Compare and discuss ideas for solving a problem with teacher and/or students to justify their thinking</li> <li>• Use manipulatives (e.g., tiles, blocks) to model the action in problems</li> <li>• Use drawings/pictures to model the action in problems</li> </ul> <p><b>Students will monitor and reflect on the process of mathematical problem solving.</b></p> <ul style="list-style-type: none"> <li>• Explain to others how a problem was solved, giving strategies and justifications</li> </ul>
<p>Reasoning and Proof Strand</p>	<p><b>Students will recognize reasoning and proof as fundamental aspects of mathematics.</b></p> <ul style="list-style-type: none"> <li>• Understand that mathematical statements can be true or false</li> <li>• Recognize that mathematical ideas need to be supported by evidence</li> </ul> <p><b>Students will make and investigate mathematical conjectures.</b></p> <ul style="list-style-type: none"> <li>• Investigate the use of knowledgeable guessing as a mathematical tool</li> <li>• Explore guesses, using a variety of objects and manipulatives</li> </ul> <p><b>Students will develop and evaluate mathematical arguments and proofs.</b></p> <ul style="list-style-type: none"> <li>• Justify general claims, using manipulatives</li> <li>• Develop and explain an argument verbally or with objects</li> <li>• Listen to and discuss claims other students make</li> </ul> <p><b>Students will select and use various types of reasoning and methods of proof.</b></p> <ul style="list-style-type: none"> <li>• Use trial and error strategies to verify claims</li> </ul>

Communication Strand	<p><b>Students will organize and consolidate their mathematical thinking through communication.</b></p> <ul style="list-style-type: none"> <li>• Understand how to organize their thought processes with teacher guidance</li> <li>• Verbally support their reasoning and answer</li> </ul> <p><b>Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.</b></p> <ul style="list-style-type: none"> <li>• Share mathematical ideas through the manipulation of objects, drawings, pictures, charts, and symbols in both written and verbal explanations</li> </ul> <p><b>Students will analyze and evaluate the mathematical thinking and strategies of others.</b></p> <ul style="list-style-type: none"> <li>• Listen to solutions shared by other students</li> <li>• Formulate mathematically relevant questions</li> </ul> <p><b>Students will use the language of mathematics to express mathematical ideas precisely.</b></p> <ul style="list-style-type: none"> <li>• Use appropriate mathematical terms, vocabulary, and language</li> </ul>
Connections Strand	<p><b>Students will recognize and use connections among mathematical ideas.</b></p> <ul style="list-style-type: none"> <li>• Recognize the connections of patterns in their everyday experiences to mathematical ideas</li> <li>• Understand the connections between numbers and the quantities they represent</li> <li>• Compare the similarities and differences of mathematical ideas</li> </ul> <p><b>Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</b></p> <ul style="list-style-type: none"> <li>• Understand how models of situations involving objects, pictures, and symbols relate to mathematical ideas</li> <li>• Understand meanings of operations and how they relate to one another</li> <li>• Understand how mathematical models represent quantitative relationships</li> </ul> <p><b>Students will recognize and apply mathematics in contexts outside of mathematics.</b></p> <ul style="list-style-type: none"> <li>• Recognize the presence of mathematics in their daily lives</li> <li>• Recognize and apply mathematics to solve problems</li> <li>• Recognize and apply mathematics to objects, pictures, and symbols</li> </ul>
Representation Strand	<p><b>Students will create and use representations to organize, record, and communicate mathematical ideas.</b></p> <ul style="list-style-type: none"> <li>• Use multiple representations including verbal and written language, acting out or modeling a situation, drawings, and/or symbols as representations</li> <li>• Share mental images of mathematical ideas and understandings</li> <li>• Use standard and nonstandard representations</li> </ul> <p><b>Students will select, apply, and translate among mathematical representations to solve problems.</b></p> <ul style="list-style-type: none"> <li>• Connect mathematical representations with problem solving</li> </ul> <p><b>Students will use representations to model and interpret physical, social, and mathematical phenomena.</b></p> <ul style="list-style-type: none"> <li>• Use mathematics to show and understand physical phenomena (e.g., estimate and represent the number of apples in a tree)</li> <li>• Use mathematics to show and understand social phenomena (e.g., count and represent sharing cookies between friends)</li> <li>• Use mathematics to show and understand mathematical phenomena (e.g., draw pictures to show a story problem, show number value using fingers on your hand)</li> </ul>

MAIN/ GENERAL TOPIC	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW:	WHAT THE STUDENT WILL BE ABLE TO DO:	Assessments:	WHEN STUDENT DOES IT:
Number Sense and Operations Strand	Number Systems	<p>Why do we need to understand numbers?</p> <p>How does counting help us in everyday life?</p>	<p>Vocabulary: after, before, cardinal numbers (1-10), count, count backwards, decrease, equal to, estimate, greater, greatest, higher, hundred chart, increase, least, less than, lower, more than, number in words (one to ten), number line, order, ordinal numbers (first - twentieth), part, skip count, whole</p> <p>Numbers 1- 100</p> <p>A variety of methods for counting (1's, 2's, 5's 10's, backwards by 1's)</p> <p>Picture representation of numbers</p> <p>How to order numbers and objects by size</p> <p>Number words to ten</p> <p>How to use a number line and number chart</p> <p>Ordinal numbers</p> <p>How to estimate</p>	<p>Count the items in a collection and know the last counting word tells how many items are in the collection (1 to 100.)</p> <p>Count out (produce) a collection of a specified size (10 to 100 items), using groups of ten.</p> <p>Quickly see and label with a number, collections of 1 to 10.</p> <p>Count by 1's to 100</p> <p>Skip count by 10's to 100</p> <p>Skip count by 5's to 50</p> <p>Skip count by 2's to 20</p> <p>Verbally count from a number other than one by 1's</p> <p>Count backwards from 20 by 1's</p> <p>Draw pictures or other informal symbols to represent a spoken number up to 20</p> <p>Identify that spacing of the same number of objects does not affect the quantity (conservation)</p> <p>Arrange objects in size order (increasing and decreasing)</p> <p>Write numbers to 100</p> <p>Read the number words <i>one, two, three ten</i></p> <p>Compare and order whole numbers up to 100</p> <p>Name the number before and the number after a given number, and name the number(s) between two given numbers up to 100 (with and without the use of a number line or a hundreds chart)</p> <p>Use before, after, or between to order numbers to 100 (with or without the use of a number line)</p> <p>Use the words higher, lower, greater, and less to compare two numbers</p> <p>Use and understand verbal ordinal terms, first to twentieth</p> <p>Estimate the number in a collection to 50 and then compare by counting the actual items in the collection</p>	<p>Teacher Observations</p> <p>Performance Assessments</p> <p>Math Journals</p> <p>Process Strands</p> <p>Center Work</p> <p>Daily Problem Solving</p> <p>Chapter / Unit Tests</p> <p>Cooperative group work</p>	<p>September And October</p>

Number Sense and Operations Strand	Place Value		Vocabulary: base ten number system, one-digit number, ones place, place value, tens place, two-digit number  Place value, tens and ones	Explore and use place value Develop an initial understanding of the base ten system: 10 ones = 1 ten 10 tens = 1 hundred		November
Number Sense and Operations Strand	Addition and Subtraction	How can adding and subtracting be used in the real world?  How to our strategies help us add, subtract and solve word problems?  How are adding and subtracting different?	Vocabulary: addend, addition, addition fact, addition sentence, addition sign, commutative property of addition, count back, count on, difference, minus, minus sign, number sentence, plus, plus sign, subtract, subtraction, subtraction fact, subtraction sentence, subtraction sign, sum  Multiple strategies to solve addition and subtraction problems (counting on, counting back, drawing pictures, using a number line, counters)  Commutative property  How to write a number sentence and what a number sentence is and represents	Develop and use strategies to solve addition and subtraction word problems Use a variety of strategies to solve addition and subtraction problems with one- and two-digit numbers without regrouping Demonstrate fluency and apply addition and subtraction facts to and including 10 Understand the commutative property of addition Use a variety of strategies to compose and decompose one-digit numbers Represent addition and subtraction word problems and their solutions as number sentences Create problem situations that represent a given number sentence Understand that different parts can be added to get the same whole	Teacher Observations  Performance Assessments  Math Journals  Process Strands  Center Work  Daily Problem Solving  Chapter / Unit Tests  Cooperative group work	November, December, and January  June- two digit numbers
Algebra	Patterns	How can patterns be or look different?	Vocabulary: next, patterns  What a pattern is Strategies to determine what comes next in a pattern	Determine and discuss patterns in arithmetic (what comes next in a repeating pattern, using numbers or objects)		January



Measurement	Units of Measurement	Do we always measure the same way?	Vocabulary: between, estimation, inch, length, long measure, nonstandard units, ruler, standard units, width	<p>Recognize length as an attribute that can be measured</p> <p>Use non-standard units (including finger lengths, paper clips, students' feet and paces) to measure both vertical and horizontal lengths</p> <p>Select and use non-standard units to estimate measurements</p> <p>Informally explore the standard unit of measure, inch</p>	Teacher Observations	May
		Why do we need to measure?	Length can be measured using non-standard units and standard units (inches)		Performance Assessments	
		What tools can we use to measure?	How to measure inches using a ruler		Math Journals	
Money		How does money help you and how can you use it?	Vocabulary: cent (¢), coin, dime, money, nickel, penny, quarter, amount	<p><i>Recognize coins (penny, nickel, dime, quarter)</i></p> <p>Recognize the cent notation as ¢</p>	Process Strands	March
		What is money and why do we need it?	Names and worth of coins		Center Work	
Time		Why is telling time important for us to know how to do?	Vocabulary: afternoon, morning, evening, night, time, analog clock, digital clock, hour, hour hand, minute hand, calendar, week, year, months of the year, seasons in relation to the months, autumn (fall), spring, summer, winter	<p>Use different combinations of coins to make money amounts up to 25 cents</p>	Daily Problem Solving	April
		Why is a calendar important?	Times of the day		Chapter / Unit Tests	
			Numbers and hands on a clock to tell time	<p>Recognize specific times (morning, noon, afternoon, evening)</p> <p>Tell time to the hour, using both digital and analog clocks</p> <p>Identify the days of the week and months of the year in sequence</p> <p>Classify months and connect to seasons and other events</p>	Cooperative group work	
			Days of the week and months of the year			
			Seasons			

<p>Statistics and Probability</p>	<p>Graphs</p>	<p>How can we show data? How does a graph help us? How does asking questions help us understand information?</p>	<p>Vocabulary: data, pictograph, Venn diagram, bar graph, chart, equal to, greater than, least, less than, likely, most, unlikely</p> <p>Multiple ways to record different forms of data (bar graphs, pictographs, Venn diagrams, charts, tally tables)</p> <p>Terms and language to explain and interpret data and graphs</p>	<p>Pose questions about themselves and their surroundings Collect and record data related to a question Display data in simple pictographs for quantities up to 20 with units of one Display data in bar graphs using concrete objects with intervals of one Use Venn diagrams to sort and describe data Interpret data in terms of the words: most, least, greater than, less than, or equal to</p> <p>Answer simple questions related to data displayed in pictographs (e.g., category with most, how many more in a category compared to another, how many all together in two categories) Discuss conclusions and make predictions in terms of the words likely and unlikely Construct a question that can be answered by using information from a graph</p>	<p>Teacher Observations</p> <p>Performance Assessments</p> <p>Math Journals</p> <p>Process Strands</p> <p>Center Work</p> <p>Daily Problem Solving</p> <p>Chapter / Unit Tests</p> <p>Cooperative group work</p>	<p>February or March</p>
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