



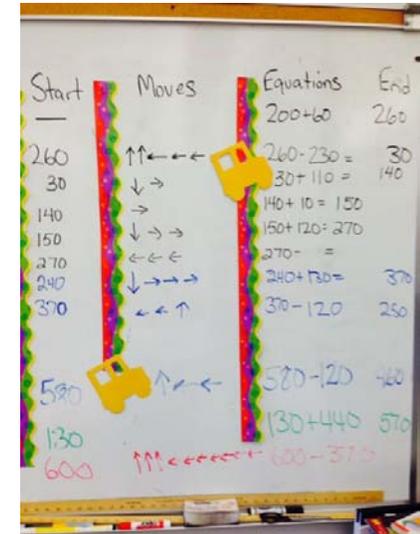
# Bedford Public Schools

## Grade 2 – Math

The second grade curriculum builds on and extends the concepts of number, measurement and geometry that were begun in earlier grades. The main focus areas for second grade in number sense are extending understanding of base-ten notation and building fluency with addition and subtraction within 100. Students are expected to master addition and subtraction facts to 20. In measurement, students recognize the need for standard units of linear measure (inches and centimeters). Students discover that the smaller the unit, the more of that unit must be used to cover a given length. They work with time (to the nearest five minutes), money (involving dollar bills and coins), and use both in problem-solving situations. As part of measurement, they learn how to represent information and data on various kinds of graphs. These include line plots, picture graphs and bar graphs. In geometry, they describe and analyze shapes by examining sides and angles. They compose and decompose shapes. These skills are needed to develop an understanding for the concepts of area, volume, congruency, similarity and symmetry for later grades.

Throughout all grades, there is an emphasis on the skills of mathematical practice that prepare children to be mathematically proficient students. These skills include making sense of problems and persevering in solving them, assessing how reasonable their answers are, explaining in words (both orally and in writing) their understanding and reasoning, attending to precision in both calculations and in math language, using appropriate math tools, and looking for and extending patterns.

Assessments happen in multiple ways routinely throughout the school year to measure student progress. Assessments consist of informal as well as formal teacher observations, small group interviews, individual interviews and checkpoints, and written tests. Student progress is monitored carefully to ensure proficiency in both the mathematical content and the practice standards that are expected at each grade level.



### Learning Expectations

[Operations and Algebraic Thinking](#)

[Number and Operations in Base Ten](#)

[Measurement and Data](#)

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**Operations and Algebraic Thinking**

<p><b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .</p>	<p><b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .</p>	<p><b>Knowledge and Skills</b> Learning this material will require students to . . .</p>
<p><b>Represent and Solve Problems Involving Addition and Subtraction</b></p> <ul style="list-style-type: none"> <li>• Adding to and putting together are two situations that involve addition.</li> <li>• Taking from, taking apart and comparing are three situations that involve subtraction.</li> <li>• Unknowns can be used in all positions when solving problems (i.e. the start, the addend or change, or the sum or difference might be unknown).</li> <li>• Addition and subtraction have an inverse relationship that can be used to solve problems and check answers.</li> </ul>	<ul style="list-style-type: none"> <li>• What are some ways to think about representing addition and subtraction problems?</li> <li>• What are ways to distinguish between addition and subtraction problems?</li> <li>• What strategies can be used to solve addition and subtraction problems?</li> </ul>	<ul style="list-style-type: none"> <li>• Add and subtract within 100 to solve one- and two-step word problems, by using drawings and equations with a symbol for the unknown number to represent the problem.</li> <li>• Develop, use and explain strategies that move toward accurately and efficiently solving multi-digit addition and subtraction problems.</li> </ul>
<p><b>Add and Subtract Within 20</b></p> <ul style="list-style-type: none"> <li>• There are strategies for learning addition and subtraction facts within 20 that will help fluency.</li> <li>• Number relationships of 0-more or less than, 1-more or less than, and 2-more or less than are the basis for addition and subtraction facts with 0, 1 and 2.</li> <li>• Doubles can be associated with real life situations.</li> <li>• Basic addition facts that are near doubles can be found using related doubles facts (i.e. doubles plus one, doubles minus one).</li> <li>• Addition facts involving 9 can be changed to an equivalent fact with 10, then subtract 1.</li> <li>• Addition facts involving 8 can be changed to an equivalent fact with 10, then subtracting 2.</li> </ul>	<ul style="list-style-type: none"> <li>• What are strategies for learning addition facts within 20?</li> <li>• What are strategies for learning subtraction facts within 20?</li> </ul>	<ul style="list-style-type: none"> <li>• Fluently* add and subtract within 20 using mental strategies: counting on, making ten, decomposing a number leading to a ten, using the relationship between addition and subtraction, creating equivalent but easier or known sums.</li> <li>• Know from memory all sums of two one-digit numbers</li> <li>• Know from memory related subtraction facts of sums of two one-digit numbers. <i>*Fluency is used in the standards as meaning “fast and accurate”. Fluency is a mixture of knowing some answers, knowing some answers from patterns, and knowing some answers from the use of strategies.</i></li> </ul>

**Operations and Algebraic Thinking (cont.)**

<p><b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .</p>	<p><b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .</p>	<p><b>Knowledge and Skills</b> Learning this material will require students to . . .</p>
<p><b>Work With Equal Groups of Objects to Gain Foundations for Multiplication</b></p> <ul style="list-style-type: none"> <li>• Some numbers can be divided into two equal parts (even numbers) and some cannot (odd numbers).</li> <li>• Repeated addition of the same addend involves joining equal groups.</li> <li>• An array involves joining equal groups and is one way to think about repeated addition.</li> <li>• Equations involve the equal sign (=). An equation shows the balance between what is on the right side and what is on the left side of the equal sign.</li> </ul>	<ul style="list-style-type: none"> <li>• How can you determine whether a number is even or odd?</li> <li>• What is the relationship between repeated addition and multiplication?</li> <li>• What is the relationship between repeated addition and arrays?</li> <li>• What is the relationship between arrays and multiplication?</li> <li>• How can repeated addition be recorded with a number sentence?</li> </ul>	<ul style="list-style-type: none"> <li>• Determine whether a group of objects (up to 20) has an odd or even number of members by pairing objects or counting them by 2's.</li> <li>• Write an equation to express an even number as a sum of two equal addends.</li> <li>• Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns.</li> <li>• Write an equation to express the total as a sum of equal addends.</li> </ul>

### Number and Operations in Base Ten

<b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .	<b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .	<b>Knowledge and Skills</b> Learning this material will require students to . . .
<p style="text-align: center;"><b>Understand Place Value</b></p> <ul style="list-style-type: none"> <li>• Our number system (Base Ten Numeration System) is a system for recording any number using digits 0-9, groups of ten and place value.</li> <li>• Our number system is based on groups of ten. Whenever we get 10 in one place, we move the next greater place value.</li> <li>• In a two-digit number, the tens digit tells how many groups of ten and the ones digit tells the number of given ones.</li> <li>• In a three-digit number, the hundreds digit tells how many groups of one hundred, the tens digit tells how many groups of ten and the ones digit tells how many groups of one.</li> <li>• The numbers 21 – 99 are written by joining two number words that describe the number of tens and the number of ones.</li> <li>• The numbers from 100 – 999 are written by joining number words that describe the number of hundreds, number of tens and number of ones.</li> <li>• Place value can be used to compare and order numbers.</li> <li>• For some relationships, mathematical symbols (i.e. <math>&lt;</math>, <math>&gt;</math>, <math>=</math>) can be used to describe how one set of numbers is related to another set.</li> </ul>	<ul style="list-style-type: none"> <li>• What is place value?</li> <li>• What number patterns are helpful in naming, reading and writing numbers to 1,000?</li> <li>• What strategies can be used to compare numbers? (up to 1,000)</li> <li>• What are the mathematical symbols that represent “more than”, “less than” and “equal to”?</li> <li>• How can number comparisons be recorded using mathematical symbols?</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones (i.e. 706 equals 7 hundreds, 0 tens and 6 ones)</li> <li>• Understand that 100 can be thought of as a bundle of ten tens – called a “hundred”.</li> <li>• Know that the numbers 100, 200...900, refer to one, two...nine hundreds (and 0 tens and 0 ones).</li> <li>• Count within 1,000 by 1’s, 5’s, 10’s and 100’s.</li> <li>• Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.</li> <li>• Compare two three-digit numbers based on meanings of hundreds, tens and ones digits, using the <math>&gt;</math>, <math>&lt;</math> and <math>=</math> symbols and words to record the results of comparisons.</li> </ul>

<p style="text-align: center;"><b>Enduring Understandings</b></p> <p style="text-align: center;">In order to meet the standards, the students will need to understand that . . .</p>	<p style="text-align: center;"><b>Essential Questions</b></p> <p style="text-align: center;">In order to understand, students will need to consider questions such as . . .</p>	<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p style="text-align: center;">Learning this material will require students to . . .</p>
<p style="text-align: center;"><b>Use Place Value Understanding and Properties of Operations to Add and Subtract</b></p> <ul style="list-style-type: none"> <li>• All sums and differences can be found using base ten block models.</li> <li>• Adding groups of tens is similar to adding numbers less than ten.</li> <li>• Adding groups of hundreds is similar to adding numbers less than ten.</li> <li>• Subtracting tens is like subtracting ones.</li> <li>• Subtracting groups of tens is similar to subtracting numbers less than ten.</li> <li>• Understand that when adding or subtracting two and three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens and ones and ones.</li> <li>• Sometimes numbers may need to be composed or decomposed in the process of adding or subtracting.</li> <li>• There are a variety of ways to add or subtract multi-digit numbers.</li> <li>• For a given set of numbers, there are relationships that are always true called properties. Properties are the rules that govern arithmetic. (i.e. Numbers can be added in any order, numbers must be subtracted in a specified order.)</li> <li>• The inverse relationship between addition and subtraction can be used to solve problems and check answers.</li> </ul>	<ul style="list-style-type: none"> <li>• What are different strategies for adding and subtracting multi-digit numbers?</li> <li>• How can place value be helpful in adding and/or subtracting multi-digit numbers?</li> <li>• What are the rules that govern addition and subtraction?</li> <li>• What are models that can effectively demonstrate addition or subtraction?</li> <li>• How can the relationship between addition and subtraction help solve problems and check answers?</li> <li>• How can using place value be helpful in mentally adding or subtracting 10 or 100 from numbers (up to 999)?</li> <li>• What are good explanations for describing why addition and subtractions strategies work?</li> </ul>	<ul style="list-style-type: none"> <li>• Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</li> <li>• Add up to four two-digit numbers using strategies based on place value and properties of operations.</li> <li>• Add and subtract within 1,000, using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction.</li> <li>• Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; sometimes it is necessary to compose or decompose 10’s or 100’s.</li> <li>• Mentally add 10 or 100 to a given number 100-900.</li> <li>• Mentally subtract 10 or 100 from a given number 100-900.</li> <li>• Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations can be supported by drawings or objects.)</li> </ul>

**Measurement and Data**

<p><b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .</p>	<p><b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .</p>	<p><b>Knowledge and Skills</b> Learning this material will require students to . . .</p>
<p><b>Measure and Estimate Lengths in Standard Units</b></p> <ul style="list-style-type: none"> <li>• Some attributes of objects are measurable and can be quantified using unit amounts.</li> <li>• The length of an object is measurable.</li> <li>• The length of any object can be used as a measurement unit for length (i.e. paperclip), but a standardized unit such as an inch or centimeter is always the same length.</li> <li>• Measurement is the process of comparing a unit to the object being measured.</li> <li>• The length of two objects can be compared by subtracting to find the differences.</li> </ul>	<ul style="list-style-type: none"> <li>• What is the process for measuring length?</li> <li>• What tools are most appropriate when measuring the length of an object?</li> <li>• What units of measure can be used for measuring length?</li> <li>• What are the standard units of length?</li> <li>• How can the length of two objects be compared?</li> </ul>	<ul style="list-style-type: none"> <li>• Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</li> <li>• Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.</li> <li>• Estimate lengths using units of inches, feet, centimeters, and meters.</li> <li>• Measure to determine how much longer one object is than another, expressing the length difference by a standard length unit.</li> </ul>
<p><b>Relate Addition and Subtraction to Length</b></p> <ul style="list-style-type: none"> <li>• Measurement in the same unit like inches can be added or subtracted in the same way as adding and subtracting whole numbers.</li> <li>• The measurement unit needs to be written with the sum or difference.</li> <li>• The set of real numbers is infinite and ordered. Each number can be associated with a unique point on a number line.</li> <li>• The space between any two consecutive whole numbers on a number line is equal.</li> <li>• Number lines can be used to show addition and subtraction problems.</li> </ul>	<ul style="list-style-type: none"> <li>• What are some strategies to solve word problems using measurement units of length?</li> <li>• How can number line diagrams be helpful in adding and subtracting numbers?</li> </ul>	<ul style="list-style-type: none"> <li>• Use addition and subtraction within 100 to solve word problems involving lengths that are given the same units by using drawings, such as drawings of rulers and equations with a symbol for the unknown number to represent the problem.</li> <li>• Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2 . . ., and represent whole number sums and differences within 100 on a number line diagram.</li> </ul>

<b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .	<b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .	<b>Knowledge and Skills</b> Learning this material will require students to . . .
<p style="text-align: center;"><b>Work With Time and Money</b></p> <ul style="list-style-type: none"> <li>• Time can be recorded on analog and digital clocks.</li> <li>• Time can be given to the nearest five minutes.</li> <li>• Time can be expressed using different units that are related to each other.</li> <li>• AM and PM designate different time periods.</li> <li>• Specific coins or bills each have a unique value. The size of a coin does not indicate its value.</li> <li>• Money amounts can usually be counted in different ways.</li> <li>• When counting money, it is usually easier to start with the coin or bill with the greater value.</li> <li>• The same amount of money can be represented using different combinations of coins and bills.</li> <li>• The process for adding and subtracting money, written using cent notation is the same as adding whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• What are analog and digital clocks?</li> <li>• What are good strategies for telling time to the nearest five-minute interval?</li> <li>• What is the difference between AM and PM?</li> <li>• What are the relationships of time?</li> <li>• How can money be used in word problems?</li> <li>• What strategies can be used to count money?</li> </ul>	<ul style="list-style-type: none"> <li>• Tell and write time from analog and digital clocks to the nearest five-minutes, using AM and PM.</li> <li>• Know the relationships of time, including seconds in a minute, minutes in an hour, hours in a day, days in a week, a month and a year; and weeks in a month and year.</li> <li>• Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies using the appropriate symbols for dollars and cents.</li> </ul>
<p style="text-align: center;"><b>Represent and Interpret Data</b></p> <ul style="list-style-type: none"> <li>• Some questions can be answered by collecting and analyzing data.</li> <li>• Data can be represented visually using line plots and graphs.</li> <li>• A line plot can be used as a visual representation of the relative length of objects.</li> <li>• The type of data determines the best type of visual representation.</li> <li>• Pictographs and bar graphs make it easy to compare data.</li> </ul>	<ul style="list-style-type: none"> <li>• How can line plots be used to show measurements when comparing the length of objects or repeated measurements of the same object?</li> <li>• How can picture graphs and bar graphs be used to represent data sets and solve simple addition and subtraction problems?</li> </ul>	<ul style="list-style-type: none"> <li>• Generate measurement data by measuring lengths of different objects to the nearest whole unit, or by making repeated measurements of the same object.</li> <li>• Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.</li> <li>• Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories and solve problems.</li> </ul>

**Geometry**

<p><b>Enduring Understandings</b> In order to meet the standards, the students will need to understand that . . .</p>	<p><b>Essential Questions</b> In order to understand, students will need to consider questions such as . . .</p>	<p><b>Knowledge and Skills</b> Learning this material will require students to . . .</p>
<p><b>Reason With Shapes and Their Attributes</b></p> <ul style="list-style-type: none"> <li>• Two- and three-dimensional objects with or without curved surfaces can be described, classified, and analyzed by their attributes.</li> <li>• A shape can be identified by the number of its sides, vertices or angles.</li> <li>• Cubes are three-dimensional shapes (solid whose length, width and height are all equal).</li> <li>• Rectangles can be partitioned into equal sized squares.</li> <li>• A region can be divided into equal-sized parts in different ways which each have their own name.</li> <li>• Equal-sized parts of a region have the same area, but not necessarily the same shape.</li> </ul>	<ul style="list-style-type: none"> <li>• How can shapes and solids be recognized and drawn using specified attributes?</li> <li>• How can circles and rectangles be divided into equal-sized parts?</li> <li>• What words can be used to name those equal-sized parts?</li> <li>• How can equal-sized parts of a region have the same area, but not necessarily the same shape?</li> </ul>	<ul style="list-style-type: none"> <li>• Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces (sizes are compared directly or visually, not comparing by measuring).</li> <li>• Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.</li> <li>• Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.</li> <li>• Partition circles and rectangles into two, three, or four equal shares and describe the shares using the words halves, thirds, half of, a third of, etc.</li> <li>• Describe the whole as two halves, three thirds, four fourths.</li> <li>• Recognize that equal shares of identical wholes need not have the same shape.</li> </ul>