

COMMUNITY UNIT SCHOOL DISTRICT 200

Elementary Math Grade 2

**Subject Expectation 1
(State Goal 6)**

The student will be able to demonstrate and apply an understanding of numbers and their operations, including meaning and relationships.

Essential Learning 1 (Learning Standard A) (Learning Standard D)	Understand numbers, ways of representing numbers, relationships among numbers, and number systems
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Critical Content	6.A.1a 6.D.1	a. represent, order, and compare whole numbers to demonstrate an understanding of the base ten number system <ul style="list-style-type: none">• whole numbers to the hundreds place• decimals to the tens place expressed using monetary units to the hundreds place
	6.A.1a	b. count with understanding including skip counting from any number up to at least 1,000
	6.A.1a, 6.D.1	c. recognize and compare “how many” in sets of objects
	6.A.1a, 6.D.1	d. recognize and explain the concept of odd and even numbers
	6.A.1a	e. recognize equivalent representations of whole numbers and generate them by composing and decomposing numbers (e.g. $123 = 100+20+3$)
	6.A.1a	f. describe numeric relationships using comparison symbols including greater than, less than, and equal to
	6.A.1a *	g. use cardinal and ordinal numbers appropriately
	6.A.1b	h. connect number words and numerals to the quantities they represent
		i. recognize the relationship between the whole and its fractional parts <ul style="list-style-type: none">• recognize when a whole or set is divided into two or four equal parts• describe parts of a whole using terms like one whole, one-half, one-quarter and explore one-third• use concrete materials and pictorial representations to model the whole to part relationships• describe parts of a whole or a set using one whole, $\frac{1}{2}$, and $\frac{1}{4}$
	6.A.1b	j. represent, order, label, and compare unit fractions using a variety of concrete materials

Essential Learning 2 (Learning Standard B)	Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships
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Critical Content	6.B.1	a. understand the effects of adding and subtracting whole numbers <ul style="list-style-type: none">• describe that numbers get larger when adding and smaller when subtracting whole numbers using appropriate symbols and vocabulary
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- 6.B.1 b. identify fact families up through 18
- 6.B.1 c. solve one-step and explore two step addition and subtraction number sentences and word problems by identifying the appropriate problem type including the four basic types of addition and subtraction story problems including join, separate, part-part-whole, and compare problems
 - join problems that take place over time and include a starting quantity, a change quantity (add or remove), and the result
 - separate word problems that take place over time and include a starting quantity, a change quantity (add or remove), and the result
 - part-part-whole involves asking the solver to figure out one of the parts
 - compare problems involve relationships between two different sets
- 6.B.1 d. describe the effects of adding and subtracting whole numbers using appropriate mathematical symbols and vocabulary
- 6.B.1 e. explore commutative property as it applies to addition
- 6.B.1 f. explore multiplication and division through equal grouping and equal sharing of objects
- 6.B.1 g. connect repeated addition to multiplication
- 6.B.1 h. solve multiplication problems for numbers 1 and ten
- * i. construct number sentences to match word problems

Essential Learning 3 (Learning Standard C)		Compute using a variety of methods and make reasonable estimates
Critical Content	6.C.1a	a. develop and use strategies to solve whole-number computations, with focus on addition and subtraction through hundreds place <ul style="list-style-type: none"> • add and subtract two and three-digit numbers without regrouping or decomposing • add and subtract two-digit numbers with regrouping or with decomposing • explore finding the sum or the difference for three digit numbers regrouping tens
	6.C.1a	b. explain and use mental math strategies to solve simple addition and subtraction problems
	6.C.1b	c. estimate sums and differences of one or two-digit numbers
	6.C.1b	d. describe reasonable and unreasonable sums and differences
	6.C.1b	e. determine whether exact answers or estimates are appropriate for solutions to problems
	6.B.1	f. demonstrate fluency with basic addition and subtraction facts using fact families up to 18
	7.A.1c	g. solve problems including making change involving the value of a collection of bills and coins, whose total value is \$1.00 or less

Essential Learning 4	*	Choose appropriate technology/tools
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| Critical Content | * | a. use appropriate technology and tools <i>such as</i> <ul style="list-style-type: none">• computer• manipulatives• calculators (optional)• number lines• flash cards• hundreds chart• base-ten blocks• paper and pencil |
| | 6.C.2a | b. develop and use strategies for whole-number computations, including mental math and estimation |
| | * | c. use language tools <i>such as</i> a math dictionary to determine meaning |

Essential Learning 5	*	Recognize the connections between number sense, other math strands, and other curricular areas
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| Critical Content | * | a. compare how reading expository and narrative text differs from reading a math story problem including <ul style="list-style-type: none">• four basic types of addition and subtraction story problems including join, separate, part-part-whole, and compare problems• join and separate problems that take place over time and include a starting quantity, a change quantity (add or remove), and the result• part-part-whole involves asking the solver to figure out one of the parts• compare problems involving relationships between two different sets |
| | * | b. use the reading comprehension strategies of inferring, questioning, determining important information, connecting, and visualizing to solve math problems |

Essential Learning 6	*	Construct and communicate convincing arguments and proofs to solve problems
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| Critical Content | * | a. use the language of numbers and their operations to express mathematical ideas precisely, both verbally and in writing |
| | * | b. draw conclusions and communicate verbally understanding of numbers <i>such as</i> <ul style="list-style-type: none">• the value of each digit depends on its place in a number• explain the rule for grouping tens when there are too many ones (called composing a number)• the rate for composing a higher value unit is ten (seventeen ones can be composed into 1 ten and 7 ones)• know that a unit of higher value can be decomposed or exchanged such as 35 equals three tens and five ones or two tens and 15 ones (avoid the term borrowing) |

- * c. demonstrate an understanding of place value and the base-ten system using multiple models *such as* concrete objects, kinesthetic actions, written language, pictures, graphs, or diagrams
- * d. explore changes among and within multiple representations *such as* concrete materials, spoken language, written language, pictures, diagrams and graphs, lists and tables, and kinesthetic ways
- * e. write an extended response for a one step problem including
 - the answer
 - the process
 - the strategy(ies)
 - the explanation including how and why
- * f. explore writing a word problem from a symbolic equation

Essential Learning 7 * **Build mathematical knowledge by using a variety of appropriate strategies to solve a problem**

- Critical Content
- * a. explore the four phases in the process of problem solving including
 - understanding the problem
 - determine the conditions of the situation
 - comprehend the language and terms used
 - identify the desired goal and understand the constraints
 - form a representation
 - examine the assumptions
 - devising a plan of attack and selecting the appropriate problem solving strategy
 - organized list
 - make a table
 - guess and check
 - act out/use problem and show reasoning
 - justify an answer by using manipulatives
 - draw a picture
 - use/find a pattern
 - work backwards
 - use logical reasoning
 - carrying out the plan
 - work through the problem
 - monitor use of the strategy
 - change strategies as necessary
 - reviewing
 - judge the reasonableness of the answer
 - * b. explore metacognitive processes to solve a problem
 - activate prior knowledge about information in the problem
 - develop various ways to represent information
 - check for understanding

**Subject Expectation 2
(State Goal 7)**

The student will be able to estimate, make, and use measurements of objects, quantities and relationships, and determine acceptable levels of accuracy.

Essential Learning 1 (Learning Standard A)	Understand measurable attributes of objects and the units, systems, and process of measurement
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| Critical Content | * | a. explain the need for standard and non-standard units in measurement |
| 7.A.1b, 7.A.1c | 7.A.1a | b. identify the type of measure including length, weight, time, temperature, and money for each measurable attribute |
| | 7.A.1d | |
| | 7.A.1a | c. describe multiple measurable attributes of a single object such as the length and the mass/weight |
| | 7.A.2a* | d. explore volume as a measure of three dimensional space through the use of cubes |
| | 7.A.2a* | e. compare and order objects according to measurable attributes |
| | 7.A.1a | f. measure objects using non-standard and standard units in the U.S. customary and metric systems including inches, feet, centimeters, and meter |
| | 7.A.1a | g. explore and describe the perimeter and area of real objects |
| | 7.A.1b | h. order events chronologically including minutes, hours, days, months, seasons, years |
| | 7.A.1b | i. tell time using an analog clock to 5-minute intervals |
| | 7.A.1c | j. count, compare, and order sets of unlike coins |
| | 7.A.1c | k. show equivalent amount of money using coins |
| | 7.A.1c | l. demonstrate and explain making change using manipulatives |
| | 7.A.1d | m. measure temperature using the Fahrenheit scale |
| | 7.A.1a | n. describe relationships within units of time, money, and length |

Essential Learning 2 (Learning Standard B) (Learning Standard C)	Apply appropriate techniques, tools and formulas to determine measurements
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| | * | a. estimate standard measurements of length, weight <i>such as</i> pounds and ounces |
| 7.B.1a | | b. select and use benchmarks to estimate measurement |
| 7.B.1b | | c. compare estimated measures to actual measures taken |
| 7.B.1b | | d. estimate elapsed time for a given task such as starting and stopping time for gym class |
| 7.B.1c | | e. estimate the amount of money needed to make purchases up through one dollar |
| 7.B.1c | | f. make change from a given amount using coins up through one dollar |
| 7.A.1a | | g. develop and use common referents for measures to make comparisons and estimates <i>such as</i> |
| 7.B.1b | | <ul style="list-style-type: none"> • use a referent to help make an estimate <i>such as</i> a paper clip is one inch, how long is the pencil |

- 7.C.1 h. develop an understanding of the use of tools to determine measurements
 geometry: ruler
 weight: balance scale
 temperature: Fahrenheit thermometer
 money: coins
 time: digital clock, analog clock
- * i. select an appropriate unit and tool for measurement

Essential Learning 3	Recognize the connections between measurement, other math strands, and other curricular areas
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- Critical Content * a. use a timeline to show relationships between events in social studies
- * b. compare distances on a map using terms *such as* closer and farther
- * c. refer to 32° as freezing temperature of water
- * d. use ordinal words when comparing up to twenty objects

Essential Learning 4	Construct and communicate convincing arguments and proofs to solve problems
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- Critical Content * a. use the language of numbers and their operations to express mathematical ideas precisely, both verbally and in writing
- * b. explain how and why a problem is solved using words or pictures
- * c. explore changes among and within multiple representations *such as* concrete materials, spoken language, written language, pictures, diagrams and graphs, lists and tables, and kinesthetic ways

Essential Learning 5	Build mathematical knowledge by using a variety of appropriate strategies to solve a problem
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- Critical Content * a. explore the four phases in the process of problem solving including
- understanding the problem
 - determine the conditions of the situation
 - comprehend the language and terms used
 - identify the desired goal and understand the constraints
 - form a representation
 - examine the assumptions
 - devising a plan of attack and selecting the appropriate problem solving strategy
 - organized list
 - make a table
 - guess and check
 - act out/use problem and show reasoning
 - justify an answer by using manipulatives
 - draw a picture
 - use/find a pattern
 - work backwards

- use logical reasoning
 - carrying out the plan
 - work through the problem
 - monitor use of the strategy
 - change strategies as necessary
 - reviewing
 - judge the reasonableness of the answer
- * b. explore metacognitive processes to solve a problem
- activate prior knowledge about information in the problem
 - develop various ways to represent information
 - check for understanding

Grade 2

such as = an example used for clarification but not a mandatory concept

including = a mandatory concept

* = exceeds state standards

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**Subject Expectation 3
(State Goal 8)**

The student will be able to use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

Essential Learning 1 (Learning Standard A) (Learning Standard B)	Understand patterns, relations, and functions
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| Critical Content | * | a. sort, classify, and order objects by multiple attributes including the use of Venn diagrams |
| | 8.A.1a | b. create rules for sorting in a single set in multiple ways |
| | 8.A.1a | c. recognize, describe and extend geometric and simple numeric patterns with repeating or growing patterns including recognizing missing elements or errors in a pattern |
| | * | d. translate from one representation to another <i>such as</i> square, triangle, square translates to ABA |
| | 8.A.1a | e. create patterns to match a given letter description <i>such as</i> ABBA and make predictions |
| | 8.A.1a | f. change patterns by manipulations of concrete materials |
| | 8.A.1a | g. analyze repeating and growing patterns |
| | 8.A.1a | h. identify errors in a given pattern |
| | 8.A.1b | i. solve simple number sentences such as $2 + \square = 5$ |

Essential Learning 2 (Learning Standard C)	Represent and analyze mathematical situations and structures using algebraic symbols
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| Critical Content | 8.C.2 | a. use the commutative property of addition ($2 + 3 = 3 + 2$) |
| | 8.C.1 | b. apply the relationship of addition and subtraction families to solve for an unknown quantity |
| | 8.C.2 | c. use the concept of equality in a balanced equation <i>such as</i> $7 + 5 = 6 + 6$ or $12 = 15 - 3$ |
| 8.A.1b | 8.D.1 | d. solve for missing numbers <i>such as</i> $3 + \underline{\quad} = 11$ or $14 - \underline{\quad} = 5$ |
| | 8.C.1 | e. solve simple number sentences with variables <i>such as</i> $8 + n = 13$ |
| | 8.C.1 | f. explore connecting repeated addition to multiplication |

Essential Learning 3 (Learning Standard C)	Use mathematical models to represent and understand quantitative relationships and solve problems
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| Critical Content | 8.C.1 | a. describe the operations of addition and subtraction orally, using manipulatives, and in writing using symbols (+, -, =) and drawings |
| | * | b. explore representing and analyzing simple patterns that show constant rates of change using T-tables |

Essential Learning 4	*	Use problem solving to analyze change in real life situations
(Learning Standard D)		

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| Critical Content | 8.D.1 | a. solve problems and justify solutions using patterns |
| | 8.D.1 | b. apply the relationship of fact families (+, -) to solve for an unknown quantity |
| | 8.B.1 | c. describe and compare qualitative and quantitative changes <i>such as</i> student grows taller/ student grows 2 inches |
| | * | d. discuss predictable change such as students grow taller not shorter as they get older |

Essential Learning 5	*	Choose appropriate technology/tools for algebraic representation
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| Critical Content | * | a. use appropriate manipulatives, tools, or technology to represent algebraic equations <i>such as</i> <ul style="list-style-type: none"> • a number balance • calculators • paper and pencil |
| | * | b. use language tools <i>such as</i> a math dictionary to determine meaning |

Essential Learning 6	*	Recognize the connections between algebra and other math strands, and other curricular areas
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| Critical Content | * | a. explore equivalencies between measurement units including weight and volume |
| | * | b. show different combinations to represent whole numbers <i>such as</i> 12 could be 2 + 10, 3 + 9, 4 + 8 |
| | * | c. show equivalency in measurement <i>such as</i> twelve inches = one foot |
| | * | d. compare how reading expository and narrative text differs from reading a math story problem |
| | * | e. use the reading comprehension strategies of making connections and inferring in a given situation |

Essential Learning 7	*	Construct and communicate convincing arguments and proofs to solve problems
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| Critical Content | * | a. use the language of algebra to express mathematical ideas precisely, both verbally and in writing |
| | * | b. make and test conjectures about mathematical properties and relationships and develop logical arguments to justify conclusions <ul style="list-style-type: none"> • explore the concept that in the commutative property, order does not matter to achieve sameness • explore the concept that an equal sign does not mean “answer,” instead it means a balanced equation |
| | * | c. use oral or written communication to explain solutions derived by using patterns |

- * d. use symbols as a way to record thinking
- * e. form a generalization about a pattern
- * f. explore changes among and within multiple representations *such as* concrete materials, spoken language, written language, pictures, diagrams and graphs, lists and table, and kinesthetic ways

Essential Learning 8 * **Build mathematical knowledge by using a variety of appropriate strategies to solve a problem**

- Critical Content
- * a. explore the four phases in the process of problem solving including
 - understanding the problem
 - determine the conditions of the situation
 - comprehend the language and terms used
 - identify the desired goal and understand the constraints
 - form a representation
 - examine the assumptions
 - devising a plan of attack and selecting the appropriate problem solving strategy
 - organized list
 - make a table
 - guess and check
 - act out/use problem and show reasoning
 - justify an answer by using manipulatives
 - draw a picture
 - use/find a pattern
 - work backwards
 - use logical reasoning
 - carrying out the plan
 - work through the problem
 - monitor use of the strategy
 - change strategies as necessary
 - reviewing
 - judge the reasonableness of the answer
 - * b. explore metacognitive processes to solve a problem
 - activate prior knowledge about information in the problem
 - develop various ways to represent information
 - check for understanding

**Subject Expectation 4
(State Goal 9)**

The student will use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

Essential Learning 1 (Learning Standard A) (Learning Standard B)	Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships
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Critical Content	9.A.1a	a. name, build, compare, and sort 2-D and 3-D shapes including circle, square, trapezoid, rectangle, triangle, ellipse, hexagon, parallelogram, rhombus, cube, cone, cylinder, sphere, pyramid, rectangular prism
	9.B.1a	
	9.B.1b*	b. draw 2 dimensional shapes
	9.A.1b	c. describe attributes and parts of 2-D and 3-D shapes <i>such as</i> faces, vertices, edges, lines/sides, angles/corners/vertices, and curves
	9.A.1a	
	9.B.1a	d. compare and contrast attributes of two- and three- dimensional objects using appropriate vocabulary
	9.B.1a	e. identify objects that are congruent
	9.B.1b	f. investigate and predict the results of putting together and taking apart 2-D and 3-D shapes <i>such as</i> 2 triangles to make a square and nets to make cubes and rectangular prisms
	9.B.1c	
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Essential Learning 2 (Learning Standard B)	*	Specify locations and describe spatial relationships using coordinate geometry and (or) other representational systems
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Critical Content	*	a. describe, name, and interpret relative positions in space using terms <i>such as</i> under, over, left, right, above, below, next to, beside, between, before, after, ahead of, and behind
	*	b. find and name locations in coordinate systems using simple maps and grids
	*	c. describe, name, apply and interpret direction and distance in navigating space (nearer, farther)

Essential Learning 3	*	Apply transformations and use symmetry to analyze mathematical situations
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Critical Content	*	a. recognize and apply translations (slides), reflections(flips), and rotations (turns) with 2-D shapes
	9.B.1c	b. recognize and create shapes that have line symmetry

Essential Learning 4 (Learning Standard C)	*	Use visualization, spatial reasoning, and geometric modeling to solve problems
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Critical Content	9A.2b	a. recognize and find geometric shapes in the environment
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Essential Learning 5	*	Choose appropriate technology/tools for geometric representations
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Critical Content	9.C.1	a. use appropriate manipulatives, tools or technology <i>such as</i>
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Grade 2
such as = an example used for clarification but not a mandatory concept
 including = a mandatory concept
 * = exceeds state standards

- computer software
- geoboards
- solids
- mirrors
- nets
- paper and pencil

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- b. use language tools *such as* a math dictionary to determine meaning

Essential Learning 6

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Recognize the connections between geometry, other math strands, and other curricular areas

Critical Content

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- a. explore perimeter

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- b. explore area

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- c. explore capacity and volume of 3-D objects

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- d. explore fractions in relation to decomposing and composing two-dimensional shapes *such as* one triangle is $\frac{1}{2}$ of a square

**Essential Learning 7
(Learning Standard C)**

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Construct and communicate convincing arguments and proofs to solve problems involving geometry

Critical Content

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- a. use the language of geometry to express mathematical ideas precisely, both verbally and in writing

- explain what it means to cut a shape in half

9.C.1*

- b. make and test conjectures about mathematical properties and relationships and develop logical arguments to justify conclusions *such as*

- prove the picture or shape “square” is a square and not a circle
- recognize, explain, and justify an extension of a geometric pattern

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- c. use oral or written communication to explain solutions derived

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- d. explore changes among and within multiple representations *such as* concrete materials, spoken language, written language, pictures, diagrams and graphs, lists and tables, and kinesthetic ways

Essential Learning 8

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Build mathematical knowledge by using a variety of appropriate strategies to solve a problem

Critical Content

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- a. explore the four phases in the process of problem solving including
- understanding the problem
 - determine the conditions of the situation
 - comprehend the language and terms used
 - identify the desired goal and understand the constraints
 - form a representation
 - examine the assumptions
 - devising a plan of attack and selecting the appropriate problem solving strategy

Grade 2

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- organized list
 - make a table
 - guess and check
 - act out/use problem and show reasoning
 - justify an answer by using manipulatives
 - draw a picture
 - use/find a pattern
 - work backwards
 - use logical reasoning
 - carrying out the plan
 - work through the problem
 - monitor use of the strategy
 - change strategies as necessary
 - reviewing
 - judge the reasonableness of the answer
- * b. explore metacognitive processes to solve a problem
- activate prior knowledge about information in the problem
 - develop various ways to represent information
 - check for understanding

**Subject Expectation 5
(State Goal 10)**

The student will select, organize and analyze data using statistical methods; predict results; and interpret uncertainty-using concepts of probability.

Essential Learning 1 (Learning Standard A) (Learning Standard B)	Develop concepts of data collection and analysis
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| Critical Content | 10.A.1a | a. represent and interpret existing data using concrete objects, pictures, tallies, bar graphs, pictographs, and tables |
| | 10.A.1b | b. organize, describe, and make predictions from existing data |
| | 10.B.1a | c. create and administer a survey for collecting and analyzing data |
| | 10.B.1b | d. collect, organize, and describe data using pictures, tallies, tables, charts, or graphs |
| | 10.B.1c | e. analyze collected data, draw conclusions, and communicate the results |

Essential Learning 2 (Learning Standard C)	Develop the concept of probability
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| Critical Content | 10.C.1a | a. explore chance through a series of experiments that are recorded and analyzed <i>such as</i> a coin toss, spinners, dice, and computer games |
| | 10.C.1b | b. list all possible outcomes of simple one-stage experiments <i>such as</i> the flip of one coin, the toss of one die, the spin of a spinner |
| | 10.C.2a* | c. explore probability as a fractional part of a group to the whole group <i>such as</i> a tossed coin can land on heads or tails and therefore it should land on heads one-half of the time |

Essential Learning 3	* Choose appropriate technology and tools for data collection and representation
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| Critical Content | * | a. use appropriate technology and tools <i>such as</i> <ul style="list-style-type: none">• computer• graph paper• manipulatives• coins, dice, spinners• paper and pencil |
| | * | b. use language tools <i>such as</i> a math dictionary to determine meaning |

Essential Learning 4	* Recognize the connections between data collection and probability, other math strands, and other curricular areas
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| Critical Content | * | a. compare how reading expository and narrative text differs from reading a math story problem |
| | * | b. use the reading comprehension strategies of inferring and |

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- questioning to analyze data in a given situation
 - recognize that some information is explicitly stated and other information is not
- * c. interpret graphs and tables in social studies and science
- * d. apply how data is used in one to one correspondence, more than and less than, and problem solving including how many more and how many less and in basic operations of addition and subtraction

Essential Learning 5	*	Construct and communicate convincing arguments and proofs to solve problems involving data analysis and probability
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| Critical Content | * | a. draw conclusions and communicate his/her reasoning verbally and in writing |
| | * | b. use appropriate vocabulary <i>such as</i> graph, data, tally, survey, probability, chance, interpret, prediction, conclusion, fraction, part, whole, impossible, certain, and 50/50 |
| | * | c. explore changes among and within multiple representations <i>such as</i> concrete materials, spoken language, written language, pictures, diagrams and graphs, lists and tables, and kinesthetic ways |

Essential Learning 6	*	Build mathematical knowledge by using a variety of appropriate strategies to solve a problem
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| Critical Content | * | a. explore the four phases in the process of problem solving including <ul style="list-style-type: none"> • understanding the problem <ul style="list-style-type: none"> • determine the conditions of the situation • comprehend the language and terms used • identify the desired goal and understand the constraints • form a representation • examine the assumptions • devising a plan of attack and selecting the appropriate problem solving strategy <ul style="list-style-type: none"> • organized list • make a table • guess and check • act out/use problem and show reasoning • justify an answer by using manipulatives • draw a picture • use/find a pattern • work backwards • use logical reasoning • carrying out the plan <ul style="list-style-type: none"> • work through the problem • monitor use of the strategy • change strategies as necessary • reviewing <ul style="list-style-type: none"> • judge the reasonableness of the answer |
| | * | b. explore metacognitive processes to solve a problem |

- activate prior knowledge about information in the problem
- develop various ways to represent information
- check for understanding

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* = exceeds state standards

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