

# Missouri Assessment Program Alternate (MAP-A)

## Alternate Performance Indicators

DEVELOPED BY

Missouri Department of Elementary and Secondary Education  
Assessment Resource Center  
Measured Progress



# Alternate Performance Indicators

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The Alternate Performance Indicators (APIs) in Chapter 5 are organized by grade span and content area. They are a subset of the Alternate Grade Level Expectations (AGLEs). For instructional planning, please refer to the AGLEs published by DESE. They may be found at the following web address: <http://www.dese.mo.gov/divimprove/assess/mapa.html>.

When using the information in this chapter to plan for MAP-A assessment, be certain to choose APIs appropriate to the student's grade level. Also, it is important to keep in mind the goal of covering the broadest range of the curriculum possible and appropriate in each student's case. Best practice for MAP-A assessment calls for selecting APIs from different big ideas within each required strand. In addition to considering breadth and depth of coverage, also consider the progression of curriculum, instruction, and the corresponding assessment from year to year throughout the student's school career.

Note: Bolded text indicates additional API language at the grade span in which it appears.

## Mathematics API Glossary

- **Area models (of fractions):** Using pictures of shapes divided into equal parts to represent fractional numbers.
- **Array:** A set of objects in equal rows and equal columns.
- **Associative property:** In addition and multiplication, the end value stays the same when the grouping of the numbers is changed.
- **Cardinality property:** When counting numbers or objects, the final number reached is the quantity of the set.
- **Classify:** Categorize by characteristics or attributes.
- **Commutative principle:** In addition and multiplication, numbers may be added or multiplied in any order.
- **Compensation:** A mental or written computation strategy that involves adjusting the original numbers in a problem to known facts or quantities then adjusting the final answer accordingly. Examples:
  - Given  $8 + 3$ , a student might add 2 to 8 to have  $10 + 3 = 13$ , then subtract 2 from 13 to compensate for the 2 added to the 8 to get 10 that results in the final answer of 11.
  - Given  $6 + 7$ , a student might take one away from the 7 to have  $6 + 6$  to get 12 then adjust the 7 that results in the final answer of 13.
  - Given  $9 \times 6$ , a student might add 1 to 9 to make 10 and take  $10 \times 6$  to get 60 then subtract 6 from 60 to compensate for the 1 added on to 9 to make 10 that results in the final answer of 54.
- **Compose or decompose numbers:** Flexibly using or knowing numbers through creating and breaking numbers apart to form equivalent representations.
- **Composition of functions (composite functions):** A combination of two functions such that the output from the first function becomes the input for the second function.
- **Compute:** To add, subtract, multiply, or divide numbers.
- **Conjecture:** A mathematical statement which has neither been proved nor denied by counterexample.
- **Discrete models:** A form of finite mathematical modeling that is fit to data. (Addition principle of Counting—if two tasks have different outcomes, the total number of outcomes is  $m + n$ ; Multiplication Principle of Counting—carryng out the first task and then carrying out the second task results in  $m \times n$  possible outcomes; tree diagrams; arrays; systematic lists; etc.)
- **Distributive property:** When one of the factors of a product is written as a sum, multiplying each addend before adding does not change the product (e.g.,  $3 \cdot (5 + 4) = (3 \cdot 5) + (3 \cdot 4)$ )
- **Equivalent ratio:** A ratio is a comparison of two similar quantities obtained by dividing one quantity by the other. Equivalent ratios are two or more ratios that represent the same amount (e.g.,  $1/2 = 4/8$ ;  $1/3 = 2/6$ ).
- **Empty Set:** the set with no elements in it.
- **Explicit function:** An explicit function of  $x$  is a function whose values are given by an explicit expression (algebraic or otherwise) in  $x$  (e.g.: the equation  $y = 2x - 3$  gives values of  $y$  as an explicit function of  $x$ ).

- **Exponential function:** A function of the form  $f(x) = ab^x$ , where  $a \neq 0$ ,  $b > 0$ ,  $b \neq 1$ , and  $x$  is a real number.
- **Expression:** A mathematical phrase that represents a number through the combination of operation symbols, numbers, and/or symbols.
- **Flexibly:** The ability to think about or model numbers in a variety of ways (e.g., Students may say that twenty-five is 2 tens and 5 ones, five more than twenty, or halfway between twenty and thirty).
- **Fluency:** The ability to compute efficiently and accurately.
- **Function:** A mathematical rule between two sets which assigns to each number of the first exactly one member of the second (e.g., [1, 2], [2, 3], [3, 4])
- **Geometric Vocabulary:** Specialized vocabulary associated with shapes and their properties.
- **Geo-solids:** Physical models of solid three-dimensional shapes with place faces.
- **Growing Pattern:** Patterns that show an arithmetic change between pairs of elements in the pattern. (growing patterns may show numbers in decreasing order or buildings in decreasing size; 3, 5, 8, 12...)
- **Informal inference:** To use information contained in the sample data to increase our knowledge of the sampled population.
- **Linear:** A relationship between two variables that can be expressed as an equation and drawn in a straight line.
- **Line of best fit:** A line, segment, or ray drawn on a scatter plot to estimate the relationship between two sets of data.
- **Map (simple):** Diagram or representation
- **Mental Strategy:** A plan, method or way to solve a problem or reach an answer without the use of writing tools and materials, computers, or any other external computational assistance.
- **Mirror line of symmetry (line of symmetry):** A line that divides a figure into two halves such that the halves are mirror images of each other.
- **Multiple:** The product of a whole number and any other whole number (e.g., the multiples of 5 include 0, 5, 10, 15).
- **Net:** A flat shape that can be folded into a three-dimensional solid
- **Network:** A collection of points which may or may not be connected by edges.
- **Non-standard units:** Measuring units that can be used to help understand the nature of units (e.g., counting with paper clips, pencils, tiles, dominoes).
- **Number conservation:** The understanding that the number of objects remains the same when they are rearranged spatially (e.g., 4 beans + 5 beans = 6 beans + 3 beans)
- **One-variable quantitative data:** Data which takes numerical values for which arithmetic operations such as adding and averaging makes sense.
- **Parameter:** A single number that describes some aspect of an entire population. Whereas, a statistic is an estimate of that value computed from some sample of the population.
- **Pre image:** The original figure in a transformation.
- **Precision:** An indication of how finely a measurement was made. When you calculate with measured values, you may need to round to the smallest place in the roughest actual measurements.

- **Properties of exponents:** Rules applied when operations are performed on algebraic expressions containing exponents (e.g.,  $a^0 = 1$ ;  $a \neq 0$ ,  $a^m a^n = a^{m+n}$ ;  $(ab)^n = a^n b^n$ ;  $(a^m)^n = a^{mn}$ ).
- **Qualitative change:** A change in the quality of something (e.g., taller, shorter, darker, lighter, warmer).
- **Quantitative change:** A change in the number of a thing that can be counted or measured.
- **Rational Number:** A real number that can be written as a ratio of two numbers (excluding 0 as a denominator), as a repeating or terminating decimal, or as an integer.
- **Representations:** The ways that mathematical ideas are represented (i.e., physical objects, drawings, charts, graphs, and symbols).
- **Situation problems:** Using objects or representations to represent real world problems.
- **Skip-count:** Counting by a number other than 1 (e.g., counting by 2s, 5s, 10s).
- **Sliding/Translating:** A transformation that involves sliding a figure a given distance in a given direction.
- **Spatial relationships:** There are four types of mathematical questions regarding navigation and maps that can help students develop spatial understandings including: direction (which way), distance (how far), location (where) and representation (what objects).
- **Standard units of measure:** Measurements that are used to communicate in the United States (customary) and around the world (metric system).
- **Three-dimensional shape:** A shape that has three dimensions (i.e., length, width, and height).
- **Transformations:** The mapping, or movement of all points of a figure in a plane according to a common operation. Examples of the operation include
  - **Rotations/turning:** Involves moving a figure at a given angle and in a given direction around a point.
  - **Dilations:** Involves enlarging (magnification) or reducing (contraction) the pre-image of an image. The image and its pre-image are similar figures.
  - **Reflections/flipping:** Involves creating a mirror image of a figure on the opposite side of a line.
  - **Translations/sliding:** Involves sliding a figure a given distance in a given direction.
- **Transitively:** Of or relating to a relationship between three elements such that if the relationship holds between the first and second elements and between the second and third elements, it holds between the first and third elements (e.g., if  $A = B$  and  $B = C$ , then  $A = C$ ).
- **Two-dimensional shape:** A shape that has only two dimensions (i.e., length and width).
- **Unit iteration:** The repetition of the same unit.
- **Visual models:** Models such as networks that could be used in analyzing and solving real problems (e.g., issues of efficiency, architecture). The models of two- and three-dimensional objects may also assist students reasoning about spatial relationships.
- **Whole numbers:** The set of counting numbers (1, 2, 3, 4...) and 0.

## Mathematics Web Resources

The following websites have been recommended by educators and content consultants as resources to aid teachers in developing task/activity ideas:

<http://www.nctm.org/>

<http://illuminations.nctm.org/>

<http://www.figurethis.org/index.html>

<http://moctm.semo.edu/>

<http://nces.ed.gov/nationsreportcard/>

## Mathematics APIs

### Elementary – Grades 3, 4, & 5

Title of Strand	Grade Focus
• Numbers and Operations ( <b>NO</b> )	Required for Grades 3-8, 10
• Algebraic Relationships ( <b>AR</b> ) <i>and/or</i> Geometric and Spatial Relationships ( <b>GS</b> )	Required for Elementary Grades 3, 4, & 5

#### Strand 1: Numbers and Operations (Select 2 APIs)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>1</b></p> <p>Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p style="text-align: center;"><b>A</b></p> <p>Read, write, and compare whole numbers</p>	<p><b>Count and recognize “how many” in a set of objects.</b></p> <p><b>NO1.0.</b> Explore quantity using manipulatives.</p> <p><b>NO1.1.</b> Represent and number small collections (1 to 4 items).</p> <p style="margin-left: 20px;"><b>a.</b> Recognize a small collection of 1 or 2 items (e.g., pointing to 1 or 2 items).</p> <p style="margin-left: 20px;"><b>b.</b> Recognize a small collection up to 4 items.</p> <p style="margin-left: 20px;"><b>c.</b> Show 1 or 2 items (e.g., responds to a verbal request for 1 or 2 items by offering quantity or holding up 1 or 2 fingers).</p> <p style="margin-left: 20px;"><b>d.</b> Show up to four items (e.g., responds to a verbal request for 4 items by offering quantity or holding up 4 fingers).</p> <p><b>NO1.2.</b> Use number words together to create the counting sequence by 1s.</p> <p style="margin-left: 20px;"><b>a.</b> Start counting sequence with 1 (e.g., 1, 2...).</p> <p style="margin-left: 20px;"><b>b.</b> Use counting sequence to show correct sequence up to <b>25</b>.</p> <p><b>NO1.3.</b> Use the counting sequence to enumerate (count 1 by 1) a collection and to identify “how many” items are in a collection.</p> <p style="margin-left: 20px;"><b>a.</b> Demonstrate 1-to-1 correspondence between objects and counting words.</p> <p style="margin-left: 20px;"><b>b.</b> Keep track of counted and uncounted objects so that each object is tagged only once.</p> <p><b>NO1.4.</b> Represent and number collections of items.</p> <p style="margin-left: 20px;"><b>a.</b> Show 1 to <b>25</b> items.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p>b. Demonstrate that the cardinal number said when counting objects is the quantity of the set (cardinality).</p> <p><b>NO1.5.</b> Flexibly cite numbers for counting.</p> <p>a. Count by 1s forward from a number other than 1.</p> <p>b. Indicate the number after a specified count term (e.g., “What number comes after 1, 2, 3, 4, and 5?” “Say the number after 10.”).</p> <p>c. Count by 1s backwards (e.g., 10, 9, 8...).</p> <p>d. Indicate the number before a specified count term (e.g., “What number comes before 12?”).</p> <p>Read, write, and compare representations of whole numbers.</p> <p><b>NO1.6.</b> Represent a number or quantity (e.g., tap, draw objects or tallies).</p> <p><b>NO1.7.</b> Discriminate between numerals and other printed symbols.</p> <p><b>NO1.8.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).</p> <p><b>NO1.9.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board).</p> <p><b>NO1.10.</b> Use numerals 1 through 9 to represent the cardinal value (how many) of a collection.</p> <p><b>NO1.11.</b> Appropriately label the quantity of an empty set (e.g., “0,” “none,” “nothing”).</p> <p><b>NO1.12.</b> Identify a 2-digit number.</p> <p><b>NO1.13.</b> Communicate 2-digit numbers.</p> <p><b>NO1.14.</b> Use written numbers or words up to 20 to represent the cardinal value of a collection.</p> <p>Compare whole numbers</p> <p><b>NO1.18.</b> Recognize or request more and less of something (e.g., which group/set contains more items?).</p> <p><b>NO1.19.</b> Compare 2 quantities (up to 4 items) as same or more. The perceptual cue for the arrangement of objects needs to be salient (e.g., organizing objects in 2 side-by-side rows).</p> <p><b>NO1.20.</b> Use counting to compare 2 quantities (up to 4 items) as same or more (number identity principle).</p>

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<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p><b>NO1.21.</b> Recognize equivalent collections of 2 or more items, despite appearances and/or arrangement (number conservation).</p> <p><b>NO1.22.</b> Use larger number principle: The later a number (word or symbol) appears in the counting sequence, the larger the collection it represents (e.g., make total comparisons of “more” or “less” for 2 collections, with 1 collection equaling 5, 10, or up to 25 items).</p> <p><b>NO1.23.</b> Demonstrate an understanding of the relation of inequality when comparing whole numbers by using “1 more,” “1 less,” “10 more,” and/or “10 less.”</p> <p><b>NO1.24.</b> Compare whole numbers to each other or to landmark whole numbers (e.g., 10 or 25).</p> <p><b>NO1.25.</b> Identify the larger of 2 written numbers.</p>
	<p><b>B</b> Represent and use rational numbers</p>	<p>Represent commonly used fractions (<math>1/2</math>, <math>1/3</math>, <math>1/4</math>).</p> <p><b>NO2.1.</b> Demonstrate an understanding of a whole unit (e.g., show 1 whole brownie [area model]).</p> <p><b>NO2.2.</b> Show that fractional parts are equal shares or equal-sized portions of a whole unit using area models and discrete models (e.g., show a fair share of a cookie, fold a piece of paper into 2 halves).</p> <p>a. Explore fractions using manipulatives.</p> <p><b>NO2.3.</b> Recognize everyday uses of fractional parts with area models using <math>1/4</math>, <math>1/2</math> (e.g., identify half of an apple; using pattern blocks, identify a trapezoid on top of a hexagon as being half of the hexagon).</p> <p><b>NO2.4.</b> Identify the relationship between the denominator and the whole (e.g., identify how many parts to the whole).</p> <p><b>NO2.5.</b> Identify the relationship between the numerator and the whole (e.g., identify how many parts are shaded within the whole).</p> <p><b>NO2.6.</b> Compare fractions by comparing portions with 2 area models (e.g., compare 2 shaded rectangles and identify which has more shaded parts).</p>

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<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>C</b> Compose and decompose numbers</p>	<p><b>Connect number words (orally) and quantities they represent. First see counts and recognize how many in a set of objects.</b></p> <p><b>NO3.1. Demonstrate that 1 symbol can represent the whole amount (cardinality).</b></p> <p><b>Compose or decompose numbers using known facts.</b></p> <p><b>NO3.2. Nonverbally demonstrate combining and separating problems.</b></p> <p>a. Add 1 item to another item. b. Subtract 1 item from 2 items.</p> <p><b>NO3.3. Use representations such as concrete materials or pictures to solve addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).</b></p> <p>a. Use sums up to 6 and corresponding differences. b. Use sums up to 10 and corresponding differences. c. Use sums up to 18 and corresponding differences. d. Connect correct symbols to operations (e.g., +, -).</p>
	<p><b>D</b> Classify and describe numeric relationships</p>	<p><b>Skip-count by 5s and 10s.</b></p> <p><b>NO4.1. Demonstrate an understanding of grouping.</b></p> <p><b>NO4.2. Skip-count by 5s and 10s using concrete and semi-concrete materials (e.g., use a 100's chart).</b></p>
<p><b>2</b> Understand meanings of operations and how they relate to one another</p>	<p><b>A</b> Represent operations</p>	<p><b>Represent a given situation involving addition.</b></p> <p><b>NO5.1. Nonverbally demonstrate combining problems.</b></p> <p>a. Add a set to another set.</p> <p><b>NO5.2. Use representations such as concrete materials or pictures to solve addition situation problems (joining actions, part-part whole relationships, and comparison situations).</b></p> <p>a. Use sums up to 6 and corresponding differences.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2</b> Understand meanings of operations and how they relate to one another</p>	<p><b>A</b> Represent operations</p>	<p><b>b. Use sums up to 10 and corresponding differences.</b>  <b>c. Use sums up to 18 and corresponding differences.</b>  <b>d. Connect correct symbols to operation (e.g., +, =).</b></p>
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>A</b> Describe or represent mental strategies</p>	<p>Recognize numerals.  <b>NO8.1.</b> Represent a number or a quantity (e.g., tap, draw objects or tallies).  <b>NO8.2.</b> Discriminate between numerals and other printed symbols.  <b>NO8.3.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).  <b>NO8.4.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board).  <b>NO8.5. Identify a 2-digit number.</b>  <b>NO8.6. Communicate 2-digit numbers.</b>  Describe or represent a mental strategy to solve a quantitative problem.  <b>NO8.9. Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</b>  <b>NO8.10. Use semi-concrete materials (e.g., numbers chart, number lines) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number 16 using a 100's chart).</b>  <b>NO8.11. Use counting on and counting down or up strategies to solve addition and subtraction problems.</b>  <b>NO8.12. Fluently know number combinations (1 through 10) for addition and subtraction.</b></p>
	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p><b>Develop and demonstrate fluency with basic number combinations (addition and subtraction).</b>  <b>NO9.1. Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</b>  <b>NO9.2. Use semi-concrete materials (e.g., numbers chart, number lines) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number 16 using a 100's chart).</b></p>

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<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p><b>NO9.3.</b> Use counting on and counting down or up strategies to solve addition and subtraction problems.</p> <p><b>NO9.4.</b> Develop fluency with basic number relationships of addition and subtraction for sums up to 10.</p>
	<p><b>C</b> Apply strategies to compute</p>	<p><b>Apply strategies to compute (addition and subtraction).</b></p> <p><b>NO10.1.</b> Use strategies to reason out unknown sums up to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</p> <p><b>NO10.2.</b> Use concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.3.</b> Use semi-concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.4.</b> Use counting on and counting down or up strategies by 10 more or less than the original number to solve addition or subtraction problems.</p> <p><b>NO10.5.</b> Compute with the operations of addition and/or subtraction.</p>
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>D</b> Estimate and justify solution</p>	<p><b>Estimate a solution to a problem (addition and subtraction).</b></p> <p><b>NO11.1.</b> Use comparisons to estimate size (e.g., “As big as a ...”).</p> <p><b>NO11.2.</b> Identify more or less.</p> <p><b>NO11.3.</b> Determine which given number is closer to the amount in a given set of 5, 10, or 20 (e.g., “Is this number closer to 10 or 20?”).</p> <p><b>NO11.4.</b> Without counting, identify a reasonable quantity when estimating the amount of objects in a given set of 5 or 10.</p> <p><b>NO11.5.</b> Estimate a solution to an addition or subtraction problem (e.g., “Is <math>9 + 9</math> closer to 10 or 20?”).</p>

**Strand 2: Algebraic Relationships and  
Geometric/Spatial Relationships (Select 2 APIs)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>Algebraic Relationships</b>		
<p style="text-align: center;"><b>1</b></p> <p>Understand patterns, relations, and functions</p>	<p style="text-align: center;"><b>A</b></p> <p>Recognize and extend patterns</p>	<p><b>Repeat patterns of sounds or shapes.</b></p> <p><b>AR1.1.</b> Recognize and extend a variety of patterns.</p> <ol style="list-style-type: none"> <li>a. Engage in pattern-related activities in the everyday environment (e.g., sound, movement, visual).</li> <li>b. Recognize the pattern of a pattern-related activity (e.g., simple singing pattern, boy-girl pattern, stand-sit pattern, <b>calendar pattern</b>).</li> <li>c. Explore simple repeating patterns with concrete materials (e.g., make “trains” or “towers” with 2 colors of snap cubes).</li> <li>d. Recognize a simple repeating (A, B) pattern with concrete materials (e.g., blue-red, blue red cubes).</li> <li>e. <b>Reproduce (by matching or being shown) a simple repeating pattern.</b></li> <li>f. <b>Explore growing patterns both with geometric elements (e.g., a growing train of blocks) and/or counting sequence.</b></li> </ol>
	<p style="text-align: center;"><b>B</b></p> <p>Create and analyze patterns</p>	<p><b>Continue patterns.</b></p> <p><b>AR2.1.</b> Create patterns.</p> <ol style="list-style-type: none"> <li>a. Create a simple repeating pattern with concrete materials.</li> <li>b. <b>Create a simple growing pattern with concrete or semi-concrete representation.</b></li> </ol>
	<p style="text-align: center;"><b>C</b></p> <p>Classify objects and representations</p>	<p><b>Sort objects by attributes.</b></p> <p><b>AR3.1. Sort, classify, and order objects.</b></p> <ol style="list-style-type: none"> <li>a. <b>Given a class of objects, engage with informal sorting experiences (e.g., help put away groceries, sort blocks by student’s chosen attribute).</b></li> <li>b. <b>Engage in sorting activities that focus on identified attributes of objects (e.g., sorting by color).</b></li> <li>c. <b>Sort objects into groups with similar traits (e.g., sort pattern blocks by size, color and shape).</b></li> </ol>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Use mathematical models to represent and understand quantitative relationships</p>	<p><b>A</b> Use mathematical models</p>	<p>Model situations that involve <b>addition and subtraction</b> of whole numbers, using pictures, objects or symbols.</p> <p><b>AR6.1.</b> Use models to represent quantitative relationships.</p> <ul style="list-style-type: none"> <li>a. Use pictures, objects, or symbols to enact stories or model situations involving whole numbers.</li> <li>b. <b>Use pictures, objects, or symbols to enact stories or model situations involving addition and subtraction of whole numbers.</b></li> </ul>
<p><b>4</b> Analyze change in various contexts</p>	<p><b>A</b> Analyze change</p>	<p><b>Describe qualitative change, such as students growing taller.</b></p> <p><b>AR7.1. Analyze change in a variety of situations.</b></p> <ul style="list-style-type: none"> <li>a. <b>Recognize change in the environment (e.g., taller, colder, darker, or heavier).</b></li> <li>b. <b>Engage in activities to keep track of change (e.g., keep track of outside temperature).</b></li> <li>c. <b>Describe change in qualitative terms (e.g., identify something as taller, colder, darker, or heavier).</b></li> </ul>
<p><b>Geometric/Spatial Relationships</b></p>		
<p><b>1</b> Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments</p>	<p><b>A</b> Describe and use geometric relationships</p>	<p><b>Recognize 2- and 3-dimensional shapes using physical models (e.g., circle, rectangle, triangle, <b>trapezoid, rhombus, sphere, rectangular prism, cylinder, prism</b>).</b></p> <p><b>GS1.1.</b> Identify, name, compare, <b>classify</b>, and/or sort 2-D shapes.</p> <ul style="list-style-type: none"> <li>a. Use 2-D shapes (e.g., pattern blocks) for informal play.</li> <li>b. Match shapes with other same-sized shapes (e.g., match 2 same-sized shapes that are <b>rectangles</b>).</li> <li>c. Match shapes with other different-sized shapes <b>and orientation</b> (e.g., match 2 different-sized <b>rectangles</b>).</li> <li>d. <b>Match and compare shapes and the parts of shapes to justify congruency.</b></li> </ul> <p><b>GS1.2.</b> Describe, draw, and represent 2-D shapes.</p> <ul style="list-style-type: none"> <li>a. Draw a 2-D shape with some accuracy.</li> <li>b. Describe a 2-D shape informally.</li> </ul>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments</p>	<p><b>A</b> Describe and use geometric relationships</p>	<p><b>GS1.3.</b> Name, describe, compare, and/or sort 3-D concrete objects.  <b>a.</b> Use 3-D solids (e.g., geo-blocks, prisms, pyramids) for informal play.  <b>b.</b> <b>Informally describe, compare, and/or sort 3-D concrete objects (e.g., identifying a cone to look like an ice-cream cone, pointing out that a sphere rolls like a ball).</b></p>
	<p><b>C</b> Compose and decompose shapes</p>	<p><b>GS2.1.</b> Compose (put together) 2-D shapes to make new shapes.  <b>a.</b> Use shapes (concrete or semi-concrete) in isolation to make a picture (e.g., use pattern blocks or paper pattern blocks to make a picture).  <b>b.</b> Use shapes (concrete or semi-concrete) by combining the shapes to make a picture or design.  <b>c.</b> Use shapes to cover an outline by trial and error (e.g., use pattern blocks to cover a pattern block puzzle shape).  <b>d.</b> <b>Compose and combine shapes into a new shape (e.g., use 2 trapezoids to make 1 hexagon).</b>  <b>GS2.2.</b> Compose 3-D shapes using physical models.  <b>a.</b> Use 3-D solids (e.g., geo-blocks, prisms, pyramids) for informal play.  <b>b.</b> Use geo-solids to compose 3-D shapes.</p>
<p><b>2</b> Specify locations and describe spatial relationships using coordinate geometry and other representational systems</p>	<p><b>A</b> Use coordinate systems</p>	<p><b>Recognize or demonstrate relative positions in space (e.g., above, below, front, behind).</b>  <b>GS3.1. Recognize or demonstrate relative positions in space.</b>  <b>a.</b> <b>Use everyday positional descriptions (e.g., over, under, near, far, between, left, right, above, below, on, beside, next to) to recognize relative positions of objects in space.</b>  <b>b.</b> <b>Use directions with positional descriptions to identify location of objects in space.</b>  <b>GS3.2. Use and create simple maps.</b>  <b>a.</b> <b>Accurately move along a path that replicates a route (e.g., move from the student’s desk to the teacher’s desk).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Apply transformations and use symmetry to analyze mathematical situations.</p>	<p><b>A</b> Use transformations on objects</p>	<p>Use manipulatives in spatial relationships in problem solving.</p> <p><b>GS4.1. Perform slides, flips, and turns of 2-D shapes.</b></p> <ul style="list-style-type: none"> <li>a. Move shapes informally to compare their parts and sizes (e.g., place one pattern block on top of another to compare).</li> <li>b. Move shapes informally to fill a pattern block puzzle or simple puzzle.</li> </ul>
	<p><b>C</b> Use symmetry</p>	<p>Recognize shapes that have symmetry.</p> <p><b>GS5.1. Recognize, create, and/or identify symmetry.</b></p> <ul style="list-style-type: none"> <li>a. Informally create 2-D shapes and/or 3-D buildings that have line symmetry.</li> </ul>
<p><b>4</b> Use visualization, spatial reasoning, and geometric modeling to solve problems.</p>	<p><b>A</b> Recognize and draw three-dimensional representations</p>	<p>Recognize geometric shapes in the surrounding environment (e.g., stop sign, number cube, ball).</p> <p><b>GS6.1. Observe, explore, recognize, and/or draw 3-D geometric shapes and structures in the environment.</b></p> <ul style="list-style-type: none"> <li>a. Observe and explore geometric solids.</li> <li>b. Informally recognize and compare objects in the surrounding environment to geometric solids (e.g., a sphere is round like a ball).</li> </ul>

# Mathematics APIs

## Middle School – Grades 6, 7, & 8

Content Area	Title of Strand	Grade Focus
<b>Mathematics</b>	<ul style="list-style-type: none"> <li>Numbers and Operations (<b>NO</b>)</li> </ul>	Required for Grades 3-8, 10
	<ul style="list-style-type: none"> <li>Data and Probability (<b>DP</b>)</li> </ul>	Required for Middle School Grades 6, 7, & 8

### Strand 1: Numbers and Operations (Select 2 APIs)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems	<b>A</b> Read, write, and compare whole numbers	<p>Count and recognize “how many” in a set of objects.</p> <p><b>NO1.0.</b> Explore quantity using manipulatives.</p> <p><b>NO1.1.</b> Represent and number small collections (1 to 4 items).</p> <p style="padding-left: 20px;"><b>a.</b> Recognize a small collection of 1 or 2 items (e.g., pointing to 1 or 2 items).</p> <p style="padding-left: 20px;"><b>b.</b> Recognize a small collection up to 4 items.</p> <p style="padding-left: 20px;"><b>c.</b> Show 1 or 2 items (e.g., responds to a verbal request for 1 or 2 items by offering quantity or holding up 1 or 2 fingers).</p> <p style="padding-left: 20px;"><b>d.</b> Show up to four items (e.g., responds to a verbal request for 4 items by offering quantity or holding up 4 fingers).</p> <p><b>NO1.2.</b> Use number words together to create the counting sequence by 1s.</p> <p style="padding-left: 20px;"><b>a.</b> Start counting sequence with 1 (e.g., 1, 2...).</p> <p style="padding-left: 20px;"><b>b.</b> Use counting sequence to show correct sequence up to <b>100</b>.</p> <p><b>NO1.3.</b> Use the counting sequence to enumerate (count 1 by 1) a collection and to identify “how many” items are in a collection.</p> <p style="padding-left: 20px;"><b>a.</b> Demonstrate 1-to-1 correspondence between objects and counting words.</p> <p style="padding-left: 20px;"><b>b.</b> Keep track of counted and uncounted objects so that each object is tagged only once.</p> <p><b>NO1.4.</b> Represent and number collections of items.</p> <p style="padding-left: 20px;"><b>a.</b> Show 1 to <b>100</b> items.</p> <p style="padding-left: 20px;"><b>b.</b> Demonstrate that the final number said when counting objects is the quantity of the set (cardinality).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p><b>NO1.5.</b> Flexibly cite numbers for counting.</p> <ol style="list-style-type: none"> <li>Count by 1s forward from a number other than 1.</li> <li>Indicate the number after a specified count term (e.g., “What number comes after 1, 2, 3, 4, and 5?” “Say the number after <b>23</b>.”).</li> <li>Count by 1s backwards (e.g., 10, 9, 8...).</li> <li>Indicate the number before a specified count term (e.g., “What number comes before <b>23</b>?”; <b>uses numbers chart</b>).</li> </ol> <p>Read, write, and compare whole numbers.</p> <p><b>NO1.6.</b> Represent a number or quantity (e.g., tap, draw objects or tallies).</p> <p><b>NO1.7.</b> Discriminate between numerals and other printed symbols.</p> <p><b>NO1.8.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).</p> <p><b>NO1.9.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board).</p> <p><b>NO1.10.</b> Use numerals 1 through 9 to represent the cardinal value (how many) of a collection.</p> <p><b>NO1.11.</b> Appropriately label the quantity of an empty set (e.g., “0,” “none,” “nothing”).</p> <p><b>NO1.12.</b> Identify a 2-digit number.</p> <p><b>NO1.13.</b> Communicate 2-digit numbers.</p> <p><b>NO1.14.</b> Use written numbers or words up to <b>100</b> to represent the cardinal value of a collection.</p> <p><b>NO1.15. Identify a 3-digit number.</b></p> <p><b>NO1.16. Communicate 3-digit numbers.</b></p> <p><b>NO1.17. Identify the larger of 2 written numbers.</b></p> <p>Compare whole numbers.</p> <p><b>NO1.18.</b> Recognize or request more and less of something (e.g., identify which group/set contains more items).</p> <p><b>NO1.19.</b> Compare 2 quantities (up to 4 items) as same or more. The perceptual cue for the arrangement of objects needs to be salient (e.g., organizing objects in 2 side-by-side rows).</p> <p><b>NO1.20.</b> Use counting to compare 2 quantities (up to 4 items) as same or more (number identity principle).</p> <p><b>NO1.21.</b> Recognize equivalent collections of 2 or more items, despite appearances and/or arrangement (number conservation).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p><b>NO1.22.</b> Use larger number principle: The later a number (word or symbol) appears in the counting sequence, the larger the collection it represents. (e.g., make total comparisons of “more” or “less” for 2 collections, with 1 collection equaling 5, 10, or up to <b>50</b> items).</p> <p><b>NO1.23.</b> Demonstrate an understanding of the relation of inequality when comparing whole numbers by using “1 more,” “1 less,” “10 more,” and/or “10 less.”</p> <p><b>NO1.24.</b> Compare whole numbers to each other or to landmark whole numbers (e.g., 10, 25 or <b>50</b>).</p> <p><b>NO1.25.</b> Identify the larger of 2 written numbers.</p> <p><b>NO1.26.</b> <b>Associate the number 0 with empty sets.</b></p>
	<p><b>B</b> Represent and use rational numbers</p>	<p>Represent commonly used fractions (<math>1/2</math>, <math>1/3</math>, <math>1/4</math>)</p> <p><b>NO2.1.</b> Demonstrate an understanding of a whole unit (e.g., Show 1 whole brownie [area model], <b>identify a pair of gloves, mittens, or boots [discrete model]</b>).</p> <p><b>NO2.2.</b> Show that fractional parts are equal shares or equal-sized portions of a whole unit using area models and discrete models (e.g., show a fair share of a cookie, fold a piece of paper into 2 halves, <b>identify 2 out of 4 children wearing a blue shirt</b>).</p> <p>a. Explore fractions using manipulatives.</p> <p><b>NO2.3.</b> Recognize everyday uses of fractional parts with area models <b>and/or discrete models</b> using <math>1/2</math>, <math>1/3</math>, <math>1/4</math> (e.g., identify half of an apple; using pattern blocks, identifies a trapezoid on top of a hexagon as being half of the hexagon).</p> <p><b>NO2.4.</b> Identify the relationship between the denominator and the whole (e.g., identify how many parts to the whole).</p> <p><b>NO2.5.</b> Identify the relationship between the numerator and the whole (e.g., identify how many parts are shaded within the whole).</p> <p><b>NO2.6.</b> Compare fractions by comparing portions with 2 area models (e.g., compare 2 shaded rectangles and identify which has more shaded parts).</p> <p><b>Recognize commonly used forms of fractions, decimals, and percents.</b></p> <p><b>NO2.7.</b> <b>Recognize fractional parts with area models and/or discrete models using <math>1/8</math>, <math>1/4</math>, <math>1/3</math>, <math>1/2</math>, <math>2/3</math>, or <math>3/4</math> (e.g., identify a rectangle that has 3 of 4 parts shaded).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>B</b> Represent and use rational numbers</p>	<p><b>NO2.8. Identify decimals as a money notation.</b>  <b>NO2.9. Demonstrate that the decimal number represents how many out of 100 (e.g., show 10 pennies out of 100).</b>  <b>NO2.10. Identify percent notation.</b></p>
	<p><b>C</b> Compose and decompose numbers</p>	<p>Connect number words (orally) and quantities they represent.            First see counts and recognize how many in a set of objects.  <b>NO3.1. Demonstrate that 1 symbol can represent the whole amount (cardinality).</b>            Compose or decompose numbers using known facts.  <b>NO3.2. Nonverbally demonstrate combining and separating problems.</b>                <b>a. Add 1 item to another item.</b>                <b>b. Subtract 1 item from 2 items.</b>  <b>NO3.3. Use representations such as concrete materials or pictures to solve addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).</b>                <b>a. Use sums up to 6 and corresponding differences.</b>                <b>b. Use sums up to 10 and corresponding differences.</b>                <b>c. Use sums up to 18 and corresponding differences.</b>                <b>d. Connect correct symbols to operations (e.g., +, -).</b>  <b>NO3.4. Demonstrate composition and decomposition of numbers without direct modeling (e.g., 5 is the same as 2 + 3).</b>  <b>NO3.5. Translate addition and subtraction word problems and their solutions into a number sentence (e.g., 8 + 2 = 10).</b>  <b>NO3.6. Use strategies to reason out unknown sums to 18 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</b>  <b>NO3.7. Use a calculator to demonstrate composition and decomposition of 1- and 2-digit numbers.</b>            Recognize equivalent representations for the same numbers.  <b>NO3.8. Represent quantities in different ways (part-whole relations) (e.g., 14 = 7 + 7; 14 = 9 + 5; 14 = 10 + 4).</b>  <b>NO3.9. Represent numbers in an expanded form (e.g., 10+7).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>D</b> Classify and describe numeric relationships</p>	<p>Skip-count by 5s and 10s.</p> <p><b>NO4.1.</b> Demonstrate an understanding of grouping</p> <p><b>NO4.2.</b> Skip-count by 5s and 10s using concrete and semi-concrete materials (e.g., uses a 100's chart).</p> <p><b>NO4.3. Demonstrate an understanding that "10" is a special unit within the base-10 systems (Unitizing: 10 represents 1 unit).</b></p> <p><b>NO4.4. Skip-count by 10s starting with a number other than a multiple of 10 (e.g., use a 100's chart to count by 10s).</b></p> <p>Classify numbers by their characteristics (e.g., odds, evens, multiples).</p> <p><b>NO4.5. Identify odd and even numbers.</b></p> <p><b>NO4.6. Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</b></p>
<p><b>2</b> Understand meanings of operations and how they relate to one another</p>	<p><b>A</b> Represent operations</p>	<p>Represent a given situation involving addition <b>and subtraction</b>.</p> <p><b>NO5.1.</b> Nonverbally demonstrate combining problems.</p> <p><b>a.</b> Add a set to another set.</p> <p><b>b. Subtract some items from a larger set.</b></p> <p><b>NO5.2.</b> Use representations such as concrete materials or pictures to solve addition <b>and subtraction</b> situation problems (joining actions, <b>separating actions</b>, part-part whole relationships and comparison situations).</p> <p><b>a.</b> Use sums up to 6 and corresponding differences.</p> <p><b>b.</b> Use sums up to 10 and corresponding differences.</p> <p><b>c.</b> Use sums up to 18 and corresponding differences.</p> <p><b>d.</b> Connect correct symbols to operation (e.g., +, -, =)</p> <p><b>NO5.3. Demonstrate adding and subtracting numbers without using manipulatives.</b></p> <p><b>NO5.4. Translate addition and subtraction situation problems and their solutions into a number sentence (e.g., <math>14 + 7 = 21</math>).</b></p> <p>Represent a given situation involving multiplication using sets and arrays.</p> <p><b>NO5.5. Recognize grouping situations.</b></p> <p><b>NO5.6. Group a small collection (e.g., make 2 groups of 2 with concrete materials) but counts by 1s.</b></p> <p><b>NO5.7. Represent multiplication situations with arrays or sets.</b></p> <p><b>NO5.8. Represent multiplication situations as repeated addition.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2</b> Understand meanings of operations and how they relate to one another</p>	<p><b>B</b> Describe effects of operations</p>	<p><b>Describe the effects of adding and subtracting whole numbers as well as the relationship between the operations.</b></p> <p><b>NO6.1. Verbally describe and demonstrate combining and separating problems.</b></p> <p>a. Add a set to another set.</p> <p>b. Subtract some items from a larger set.</p> <p><b>NO6.2. Use representations such as concrete materials or pictures to describe addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).</b></p> <p>a. Use sums up to 6 and corresponding differences.</p> <p>b. Use sums up to 10 and corresponding differences.</p> <p>c. Use sums up to 18 and corresponding differences.</p>
	<p><b>C</b> Apply properties of operations</p>	<p><b>NO7.1. Recognize commutative property of addition (e.g., <math>3 + 5 = 5 + 3</math>).</b></p> <p><b>NO7.2. Recognize that when adding 3 or more numbers, it does not matter whether the first pair or the last pair is added first (associative property of addition [e.g., <math>(3 + 5) + 2 = 3 + (5 + 2)</math>]).</b></p>
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>A</b> Describe or represent mental strategies</p>	<p>Recognize numerals.</p> <p><b>NO8.1.</b> Represent a number or a quantity (e.g., tap, draw objects or tallies).</p> <p><b>NO8.2.</b> Discriminate between numerals and other printed symbols.</p> <p><b>NO8.3.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).</p> <p><b>NO8.4.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board).</p> <p><b>NO8.5.</b> Identify a 2-digit number.</p> <p><b>NO8.6.</b> Communicate 2-digit numbers.</p> <p><b>NO8.7. Identify a 3-digit number.</b></p> <p><b>NO8.8. Communicate 3-digit numbers.</b></p> <p>Describe or represent a mental strategy to solve a quantitative problem.</p> <p><b>NO8.9.</b> Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>A</b> Describe or represent mental strategies</p>	<p><b>NO8.10.</b> Use semi-concrete materials (e.g., numbers chart, number line) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number <b>56</b> using a 100's chart).</p> <p><b>NO8.11.</b> Use counting on and counting down or up strategies to solve addition and subtraction problems.</p> <p><b>NO8.12.</b> Fluently know number combinations (1 through 10) for addition and subtraction.</p> <p><b>NO8.13.</b> <b>Use strategies to reason out unknown sums to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</b></p> <p><b>NO8.14.</b> <b>Use concrete materials to show addition or subtraction with 2-digit multiples of 10.</b></p> <p><b>NO8.15.</b> <b>Use semi-concrete materials to show addition or subtraction with 2-digit multiples of 10.</b></p> <p><b>NO8.16.</b> <b>Use counting on and counting down or up strategies by 10 more or less than the original number to solve addition or subtraction problems with multiples of 10.</b></p> <p><b>NO8.17.</b> <b>Make change from \$1.00 or less.</b></p>
	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p>Develop and demonstrate fluency with basic number combinations (addition, subtraction, <b>and multiplication</b>).</p> <p><b>NO9.1.</b> Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</p> <p><b>NO9.2.</b> Use semi-concrete materials (e.g., numbers chart, number line) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number 16 using a 100's chart).</p> <p><b>NO9.3.</b> Use counting on and counting down or up strategies to solve addition and subtraction problems.</p> <p><b>NO9.4.</b> Develop fluency with basic number relationships of addition and subtraction for sums up to 10.</p> <p><b>NO9.5.</b> <b>Use strategies to reason out unknown sums up to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</b></p> <p><b>Multiplication</b></p> <p><b>NO9.6.</b> <b>Recognize grouping situations.</b></p> <p><b>NO9.7.</b> <b>Group a small collection (e.g., make 2 groups of 2 with concrete materials).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p><b>NO9.8.</b> Use representations such as concrete materials or pictures to represent a multiplication situation.</p> <p><b>NO9.9.</b> Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</p> <p><b>NO9.10.</b> Model multiplication situations with repeated addition or with an array.</p> <p><b>NO9.11.</b> Use strategies to identify multiplication combinations.</p>
	<p><b>C</b> Apply strategies to compute</p>	<p>Apply strategies to compute (addition, subtraction, <b>and multiplication</b>).</p> <p><b>NO10.1.</b> Use strategies to reason out unknown sums up to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</p> <p><b>NO10.2.</b> Use concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.3.</b> Use semi-concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.4.</b> Use counting on and counting down or up strategies by 10 more or less than the original number to solve addition or subtraction problems.</p> <p><b>NO10.5.</b> Compute with the operations of addition and/or subtraction.</p> <p><b>Multiplication</b></p> <p><b>NO10.6.</b> Recognize grouping situations.</p> <p><b>NO10.7.</b> Group a small collection (e.g., make 2 groups of 2 with concrete materials).</p> <p><b>NO10.8.</b> Use representations such as concrete materials or pictures to represent a multiplication situation.</p> <p><b>NO10.9.</b> Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</p> <p><b>NO10.10.</b> Represent multiplication situations with repeated addition or with an array.</p> <p><b>NO10.11.</b> Use strategies to identify multiplication combinations.</p> <p><b>NO10.12.</b> Compute with the operations of multiplication.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and make reasonable estimates</p>	<p><b>D</b> Estimate and justify solution</p>	<p>Estimate a solution to a problem (addition, subtraction, <b>and multiplication</b>).</p> <p><b>NO11.1.</b> Use comparisons to estimate size (e.g., “As big as a ...”).</p> <p><b>NO11.2.</b> Identify more or less.</p> <p><b>NO11.3.</b> Determine which given number is closer to the amount in a given set of 5, 10, or 20 (e.g., “Is this number closer to 10 or 20?”).</p> <p><b>NO11.4.</b> Without counting, identify a reasonable quantity when estimating the amount of objects in a given set of 5 or 10.</p> <p><b>NO11.5.</b> Estimate a solution to an addition or subtraction problem (e.g., “Is <math>9 + 9</math> closer to 10 or 20?”).</p> <p><b>NO11.6.</b> <b>Estimate a solution to a multiplication problem (e.g., “2 groups of 9 equal 18. Would 3 groups of 9 be closer to 20 or 30?”).</b></p>

**Strand 2: Data and Probability (Select 2 APIs)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</p>	<p><b>A</b> Formulate questions</p>	<p><b>Develop procedures to address a given question.</b></p> <p><b>DP1.1.</b> Formulate questions that can be addressed with data collection.</p> <p><b>a.</b> Identify what information would be interesting to know (e.g., favorite television show, favorite ice cream, number of pets, teeth lost).</p> <p><b>b.</b> Pose a question to find information (e.g., “How many pets do you have?”).</p> <p><b>DP1.2.</b> Collect and record data.</p> <p><b>a.</b> Attend to another person collecting and recording data.</p> <p><b>b.</b> Indicate an awareness of collections within the environment.</p> <p><b>c.</b> <b>When given a problem or situation, determine the data that must be collected.</b></p> <p><b>d.</b> <b>Identify where and how to collect the data (e.g., ask classmates, use counts and tallies).</b></p> <p><b>e.</b> <b>Identify how much data to collect.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</p>	<p><b>B</b> Classify and organize data</p>	<p>Sort <b>and classify</b> items according to their attributes.  <b>DP2.1.</b> Make decisions on how to classify data.  <b>a.</b> Given a class of objects, engage with informal sorting experiences (e.g., help put away groceries, sort blocks by a chosen attribute).  <b>b.</b> Engage in sorting activities that focus on identified attributes of objects (e.g., sorting by color, <b>playing sorting games</b>).</p>
	<p><b>C</b> Represent and interpret data</p>	<p>Represent data using <b>pictures and bar graphs</b>.  <b>DP3.1.</b> Represent data.  <b>a.</b> Attend to charts, graphs, or tables.  <b>b.</b> Represent a small data set with physical objects.  <b>c.</b> <b>Demonstrate awareness that symbols may be used to represent objects and events (e.g., picture of ice cream cone represents favorite avor of ice cream).</b>  <b>d.</b> <b>Display data using a variety of representations (e.g., pictures and bar graphs).</b>  <b>DP3.2.</b> Interpret data.  <b>a.</b> Attend to a display of data.  <b>b.</b> Make observational statements about the data (identifying which category in the data set has the most).</p>
<p><b>2</b> Select and use appropriate statistical methods to analyze data</p>	<p><b>A</b> Describe and analyze data</p>	<p>Analyze data for patterns. <b>Describe important features of the data.</b>  <b>DP4.1.</b> Describe and analyze data.  <b>a.</b> Indicate an understanding of comparison words to describe collections in the school setting (e.g., more, most, less, fewer, same, none, larger, smaller, middle).  <b>b.</b> Use comparison words to describe collections in the school setting (e.g., more, most, less, fewer, same, none, larger, smaller, middle).  <b>c.</b> <b>Determine which category has the most.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Develop and evaluate inferences and predictions that are based on data</p>	<p><b>A</b> Develop and evaluate inferences</p>	<p>Given a set of data, propose and justify a conclusion that is based on the data.</p> <p><b>DP6.1.</b> Discuss and make predictions.</p> <ul style="list-style-type: none"> <li>a. Attend to discussions using prediction words such as “likely” and “unlikely.”</li> <li>b. Discuss events related to previous experiences, using prediction words such as “likely” and “unlikely.”</li> <li>c. <b>Justify a conclusion based on data (e.g., “Why do we need to wear a coat at this time of year?”).</b></li> </ul>
<p><b>4</b> Understand and apply basic concepts of probability</p>	<p><b>A</b> Apply basic concepts of probability</p>	<p><b>Describe the degree of likelihood of events, using words or symbols (e.g., certain, equally likely, impossible).</b></p> <p><b>DP7.1. Apply basic concepts of probability.</b></p> <ul style="list-style-type: none"> <li>a. <b>Attend to another person using a chance device (e.g., spinner, dice) and to a person recording outcomes of a chance device.</b></li> <li>b. <b>Attend to a person describing the likelihood of events (chance or daily), using words such as “likely,” “certain,” “equally likely,” and “not likely.”</b></li> <li>c. <b>Describe the likelihood of events (daily) using words such as “likely,” “certain,” “equally likely,” and “not likely.”</b></li> </ul>

# Mathematics APIs

## High School – Grade 10

Title of Strand	Grade Focus
<ul style="list-style-type: none"> <li>• Numbers and Operations <b>(NO)</b></li> </ul>	Required at Grades 3-8, 10
<ul style="list-style-type: none"> <li>• Measurement <b>(ME)</b></li> </ul>	Required for High School Grade 10

### Strand 1: Numbers and Operations (Select 2 APIs)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>1</b></p> Understand numbers, ways of representing numbers, relationships among numbers and number systems	<p style="text-align: center;"><b>A</b></p> Read, write, and compare whole numbers	Count and recognize “how many” in a set of objects. <ul style="list-style-type: none"> <li><b>NO1.0.</b> Explore quantity using manipulatives.</li> <li><b>NO1.1.</b> Represent and number small collections (1 to 4 items).               <ul style="list-style-type: none"> <li><b>a.</b> Recognize a small collection of 1 or 2 items (e.g., pointing to 1 or 2 items).</li> <li><b>b.</b> Recognize a small collection up to 4 items.</li> <li><b>c.</b> Show 1 or 2 items (e.g., responds to a verbal request for 1 or 2 items by offering quantity or holding up 1 or 2 fingers).</li> <li><b>d.</b> Show up to four items (e.g., responds to a verbal request for 4 items by offering quantity or holding up 4 fingers).</li> </ul> </li> <li><b>NO1.2.</b> Use number words together to create the counting sequence by 1s.               <ul style="list-style-type: none"> <li><b>a.</b> Start counting sequence with 1 (e.g., 1, 2...).</li> <li><b>b.</b> Use counting sequence to show correct sequence up to 100 <b>and beyond</b>.</li> </ul> </li> <li><b>NO1.3.</b> Use the counting sequence to enumerate (count 1 by 1) a collection and to identify how many items are in a collection.               <ul style="list-style-type: none"> <li><b>a.</b> Demonstrate 1-to-1 correspondence between objects and counting words.</li> <li><b>b.</b> Keep track of counted and uncounted objects so that each object is tagged only once.</li> </ul> </li> <li><b>NO1.4.</b> Represent and number collections of items.               <ul style="list-style-type: none"> <li><b>a.</b> Show 1 to 100 items <b>and beyond</b>.</li> <li><b>b.</b> Demonstrate that the final number said when counting objects is the quantity of the set (cardinality).</li> </ul> </li> </ul>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p><b>NO1.5.</b> Flexibly cite numbers for counting.</p> <ol style="list-style-type: none"> <li>Count by 1s forward from a number other than 1.</li> <li>Indicate the number after a specified count term (e.g., “What number comes after 1, 2, 3, 4, and 5?” or “Say the number after <b>230</b>.”).</li> <li>Count by 1s backwards (e.g., 10, 9, 8...; <b>30, 29, 28</b>...).</li> <li>Indicate the number before a specified count term (e.g., “What number comes before 23 or <b>283</b>?”; uses numbers chart).</li> </ol> <p>Read, write, and compare whole numbers.</p> <p><b>NO1.6.</b> Represent a number or quantity (e.g., tap, draw objects or tallies).</p> <p><b>NO1.7.</b> Discriminate between numerals and other printed symbols.</p> <p><b>NO1.8.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).</p> <p><b>NO1.9.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board, etc.).</p> <p><b>NO1.10.</b> Use numerals 1 through 9 to represent the cardinal value (how many) of a collection.</p> <p><b>NO1.11.</b> Appropriately label the quantity of an empty set (e.g., “0”, “none”, “nothing”).</p> <p><b>NO1.12.</b> Identify a 2-digit number.</p> <p><b>NO1.13.</b> Communicate 2-digit numbers.</p> <p><b>NO1.14.</b> Use written numbers or words up to 100 <b>and beyond</b> to represent the cardinal value of a collection.</p> <p><b>NO1.15.</b> Identify a 3-digit number <b>or beyond</b>.</p> <p><b>NO1.16.</b> Communicate 3-digit numbers <b>or beyond</b>.</p> <p><b>NO1.17.</b> Identify the larger of 2 written numbers</p> <p>Compare whole numbers.</p> <p><b>NO1.18.</b> Recognize or request more and less of something (e.g., identify which group/set contains more items).</p> <p><b>NO1.19.</b> Compare 2 quantities (up to 4 items) as same or more. The perceptual cue for the arrangement of objects needs to be salient (e.g., organizing objects in 2 side-by-side rows).</p> <p><b>NO1.20.</b> Use counting to compare 2 quantities (up to 4 items) as same or more (number identity principle).</p> <p><b>NO1.21.</b> Recognize equivalent collections of 2 or more items, despite appearances and/or arrangement (number conservation).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>A</b> Read, write, and compare whole numbers</p>	<p><b>NO1.22.</b> Use larger number principle: The later a number (word or symbol) appears in the counting sequence, the larger the collection it represents. (e.g., make total comparisons of “more” or “less” for 2 collections, with 1 collection equaling 5, 10, 50, or up to <b>100</b> items).</p> <p><b>NO1.23.</b> Demonstrate an understanding of the relation of inequality when comparing whole numbers by using “1 more,” “1 less,” “10 more,” and/or “10 less.”</p> <p><b>NO1.24.</b> Compare whole numbers to each other or to landmark whole numbers (10, 25, 50 <b>or</b> 100).</p> <p><b>NO1.25.</b> Identify the larger of 2 written numbers.</p> <p><b>NO1.26.</b> Associate the number 0 with empty sets.</p>
	<p><b>B</b> Represent and use rational numbers</p>	<p>Represent commonly used fractions (<math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>).</p> <p><b>NO2.1.</b> Demonstrate an understanding of a whole unit (e.g., Show 1 whole brownie [area model], identify a pair of gloves, mittens, or boots [discrete model]).</p> <p><b>NO2.2.</b> Show that fractional parts are equal shares or equal-sized portions of a whole unit using area models and discrete models (e.g., show a fair share of a cookie, fold a piece of paper into 2 halves, identify 2 out of 4 children wearing a blue shirt).</p> <p><b>a.</b> Explore fractions using manipulatives.</p> <p><b>NO2.3.</b> Recognize everyday uses of fractional parts with area models and/or discrete models using <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{2}</math> (e.g., identify half of an apple; using pattern blocks, identifies a trapezoid on top of a hexagon as being half of the hexagon).</p> <p><b>NO2.4.</b> Identify the relationship between the denominator and the whole (e.g., identify how many parts to the whole).</p> <p><b>NO2.5.</b> Identify the relationship between the numerator and the whole (e.g., identify how many parts are shaded within the whole).</p> <p><b>NO2.6.</b> Compare fractions by comparing portions with 2 area models (e.g., compare 2 shaded rectangles and identify which has more shaded parts).</p> <p>Recognize commonly used forms of fractions, decimals, and percents.</p> <p><b>NO2.7.</b> Recognize fractional parts with area models and/or discrete models using <math>\frac{1}{8}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{2}</math>, <math>\frac{2}{3}</math>, or <math>\frac{3}{4}</math> (e.g., identify a rectangle that has 3 of 4 parts shaded).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>B</b> Represent and use rational numbers</p>	<p><b>NO2.8.</b> Identify decimals as a money notation.  <b>NO2.9.</b> Demonstrate that the decimal number represents how many out of 100 (e.g., show 10 pennies out of 100).  <b>NO2.10.</b> Identify percent notation.</p>
	<p><b>C</b> Compose and decompose numbers</p>	<p>Connect number words (orally) and quantities they represent. First see counts and recognize how many in a set of objects.  <b>NO3.1.</b> Demonstrate that 1 symbol can represent the whole amount (cardinality).            Compose or decompose numbers using known facts.  <b>NO3.2.</b> Nonverbally demonstrate combining and separating problems.                <b>a.</b> Add 1 item to another item.                <b>b.</b> Subtract 1 item from 2 items.  <b>NO3.3.</b> Use representations such as concrete materials or pictures to solve addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).                <b>a.</b> Use sums up to 6 and corresponding differences.                <b>b.</b> Use sums up to 10 and corresponding differences.                <b>c.</b> Use sums up to 18 and corresponding differences.                <b>d.</b> Connect correct symbols to operations (e.g., +, -).  <b>NO3.4.</b> Demonstrate composition and decomposition of numbers without direct modeling (e.g., 5 is the same as 2 + 3).  <b>NO3.5.</b> Translate addition and subtraction word problems and their solutions into a number sentence (e.g., <math>8 + 2 = 10</math>).  <b>NO3.6.</b> Use strategies to reason out unknown sums to 18 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).  <b>NO3.7.</b> Use a calculator to demonstrate composition and decomposition of 1- and 2-digit numbers.            Recognize equivalent representations for the same numbers.  <b>NO3.8.</b> Represent quantities in different ways (part-whole relations) (e.g., <math>14 = 7 + 7</math>, <math>14 = 9 + 5</math>, or <math>14 = 10 + 4</math>).  <b>NO3.9.</b> Represent numbers in an expanded form (e.g., <math>10 + 7</math> or <math>100 + 10 + 7</math>).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b></p> <p>Understand numbers, ways of representing numbers, relationships among numbers and number systems</p>	<p><b>D</b></p> <p>Classify and describe numeric relationships</p>	<p>Skip-count by 5s and 10s.</p> <p><b>NO4.1.</b> Demonstrate an understanding of grouping.</p> <p><b>NO4.2.</b> Skip-count by 5s and 10s using concrete and semi-concrete materials (e.g., use a 100's chart).</p> <p><b>NO4.3.</b> Demonstrate an understanding that "10" is a special unit within the base-10 systems (unitizing: 10 represents 1 unit).</p> <p><b>NO4.4.</b> Skip-count by 10s starting with a number other than a multiple of 10 (e.g., use a 100's chart to count by 10s).</p> <p>Classify numbers by their characteristics (e.g., odds, evens, multiples).</p> <p><b>NO4.5.</b> Identify odd and even numbers.</p> <p><b>NO4.6.</b> Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</p>
<p><b>2</b></p> <p>Understand meanings of operations and how they relate to one another</p>	<p><b>A</b></p> <p>Represent Operations</p>	<p>Represent a given situation involving addition and subtraction.</p> <p><b>NO5.1.</b> Nonverbally demonstrate combining problems.</p> <p><b>a.</b> Add a set to another set.</p> <p><b>b.</b> Subtract some items from a larger set.</p> <p><b>NO5.2.</b> Use representations such as concrete materials or pictures to solve addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).</p> <p><b>a.</b> Use sums up to 6 and corresponding differences.</p> <p><b>b.</b> Use sums up to 10 and corresponding differences.</p> <p><b>c.</b> Use sums up to 18 and corresponding differences.</p> <p><b>d.</b> Connect correct symbols to operation (e.g., +, -, =).</p> <p><b>NO5.3.</b> Demonstrate adding and subtracting numbers without using manipulatives.</p> <p><b>NO5.4.</b> Translate addition and subtraction situation problems and their solutions into a number sentence (e.g., <math>14 + 7 = 21</math>).</p> <p>Represent a given situation involving multiplication <b>and</b> division using sets and arrays.</p> <p><b>NO5.5.</b> Recognize grouping situations.</p> <p><b>NO5.6.</b> Group a small collection (e.g., makes 2 groups of 2 with concrete materials) but counts by 1s.</p> <p><b>NO5.7.</b> Represent multiplication situations with arrays or sets.</p> <p><b>NO5.8.</b> Represent multiplication situations as repeated addition.</p> <p><b>NO5.9.</b> <b>Represent division situations as repeated subtraction.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2</b> Understand meanings of operations and how they relate to one another</p>	<p><b>B</b> Describe effects of operations</p>	<p>Describe the effects of adding, subtracting, <b>multiplying, and dividing</b> whole numbers as well as the relationship between the operations.</p> <p><b>NO6.1.</b> Verbally describe and demonstrate combining and separating problems.</p> <p><b>a.</b> Add a set to another set.</p> <p><b>b.</b> Subtract some items from a larger set.</p> <p><b>NO6.2.</b> Use representations such as concrete materials or pictures to describe addition and subtraction situation problems (joining actions, separating actions, part-part whole relationships, and comparison situations).</p> <p><b>a.</b> Use sums up to 6 and corresponding differences.</p> <p><b>b.</b> Use sums up to 10 and corresponding differences.</p> <p><b>c.</b> Use sums up to 18 and corresponding differences.</p> <p><b>NO6.3. Use representation such as concrete materials or pictures to describe multiplication and/or division situation problems.</b></p>
	<p><b>C</b> Apply properties of operations</p>	<p><b>NO7.1.</b> Recognize commutative property of addition (e.g., <math>3 + 5 = 5 + 3</math>).</p> <p><b>NO7.2.</b> Recognize that when adding 3 or more numbers, it does not matter whether the first pair or the last pair is added first (associative property of addition [e.g., <math>(3 + 5) + 2 = 3 + (5 + 2)</math>]).</p>
<p><b>3</b> Compute fluently and makes reasonable estimates</p>	<p><b>A</b> Describe or represent mental strategies</p>	<p>Recognize numerals.</p> <p><b>NO8.1.</b> Represent a number or a quantity (e.g., tap, draw objects or tallies).</p> <p><b>NO8.2.</b> Discriminate between numerals and other printed symbols.</p> <p><b>NO8.3.</b> Identify/recognize numerals 1 through 10 (e.g., point out a 5, given a choice of numerals).</p> <p><b>NO8.4.</b> Communicate numerals 1 through 9 (e.g., write, use number cards, communication board).</p> <p><b>NO8.5.</b> Identify a 2-digit number.</p> <p><b>NO8.6.</b> Communicate 2-digit numbers.</p> <p><b>NO8.7.</b> Identify a 3-digit number.</p> <p><b>NO8.8.</b> Communicate 3-digit numbers.</p> <p>Describe or represent a mental strategy to solve a quantitative problem.</p> <p><b>NO8.9.</b> Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and makes reasonable estimates</p>	<p><b>A</b> Describe or represent mental strategies</p>	<p><b>NO8.10.</b> Use semi-concrete materials (e.g., <b>100's</b> chart, number line) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number 56 using a 100's chart).</p> <p><b>NO8.11.</b> Use counting on and counting down or up strategies to solve addition and subtraction problems.</p> <p><b>NO8.12.</b> Fluently know number combinations (1 through 10) for addition and subtraction.</p> <p><b>NO8.13.</b> Use strategies to reason out unknown sums to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</p> <p><b>NO8.14.</b> Use concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO8.15.</b> Use semi-concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO8.16.</b> Use counting on and counting down or up strategies by 10 more or less than the original number to solve addition or subtraction problems with multiples of 10.</p> <p><b>NO8.17.</b> Make change from \$1.00 or less.</p> <p><b>NO8.18.</b> <b>Adds and/or subtracts 2-digit numbers with student-identified strategy.</b></p>
	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p>Develop and demonstrate fluency with basic number combinations (addition, subtraction, multiplication, <b>and division</b>).</p> <p><b>NO9.1.</b> Use concrete materials (e.g., cubes) to show 1 or 2 more or less than the original number.</p> <p><b>NO9.2.</b> Use semi-concrete materials (e.g., number charts, number lines) to show 1 or 2 more or less than the original number (e.g., identify 2 more than the number 16 using a 100's chart).</p> <p><b>NO9.3.</b> Use counting on and counting down or up strategies to solve addition and subtraction problems.</p> <p><b>NO9.4.</b> Develop fluency with basic number relationships of addition and subtraction for sums up to 10.</p> <p><b>NO9.5.</b> Use strategies to reason out unknown sums up to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</p> <p><b>Multiplication and Division</b></p> <p><b>NO9.6.</b> Recognize grouping situations.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and makes reasonable estimates</p>	<p><b>B</b> Develop and demonstrate fluency with basic numbers</p>	<p><b>NO9.7.</b> Group a small collection (e.g., make 2 groups of 2 with concrete materials) <b>or separate a small collection into equal groups.</b></p> <p><b>NO9.8.</b> Use representations such as concrete materials or pictures to represent a multiplication or division situation.</p> <p><b>NO9.9.</b> Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</p> <p><b>NO9.10.</b> Model multiplication <b>or division</b> situations with repeated addition or with an array.</p> <p><b>NO9.11.</b> Use strategies to identify multiplication <b>or division</b> combinations.</p>
	<p><b>C</b> Apply strategies to compute</p>	<p>Apply strategies to compute (addition, subtraction, multiplication, <b>and division</b>).</p> <p><b>NO10.1.</b> Use strategies to reason out unknown sums up to 20 and their subtraction counterparts (e.g., double plus or minus, making 10s, using compensation, using known facts).</p> <p><b>NO10.2.</b> Use concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.3.</b> Use semi-concrete materials to show addition or subtraction with 2-digit multiples of 10.</p> <p><b>NO10.4.</b> Use counting on and counting down or up strategies by 10 more or less than the original number to solve addition or subtraction problems.</p> <p><b>NO10.5.</b> Compute with the operations of addition and/or subtraction.</p> <p><b>Multiplication and Division</b></p> <p><b>NO10.6.</b> Recognize grouping situations.</p> <p><b>NO10.7.</b> Group a small collection (e.g., make 2 groups of 2 with concrete materials) <b>or separate a small collection into equal groups.</b></p> <p><b>NO10.8.</b> Use representations such as concrete materials or pictures to represent a multiplication <b>or division</b> situation.</p> <p><b>NO10.9.</b> Show multiples of a number by skip-counting (e.g., skip-counting on a 100's chart).</p> <p><b>NO10.10.</b> Represent multiplication <b>or division</b> situations with repeated addition or with an array.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Compute fluently and makes reasonable estimates</p>	<p><b>C</b> Apply strategies to compute</p>	<p><b>NO10.11.</b> Use strategies to identify multiplication <b>or division</b> combinations. <b>NO10.12.</b> Compute with the operations of multiplication <b>and/or division</b>.</p>
	<p><b>D</b> Estimate and justify solution</p>	<p>Estimate a solution to a problem (addition, subtraction, multiplication, <b>and division</b>).</p> <p><b>NO11.1.</b> Use comparisons to estimate size (e.g., “As big as a ...”). <b>NO11.2.</b> Identify more or less. <b>NO11.3.</b> Determine which given number is closer to the amount in a given set of 5, 10, or 20 (e.g., “Is this number closer to 10 or 20?”). <b>NO11.4.</b> Without counting, identify a reasonable quantity when estimating the amount of objects in a given set of 5 or 10. <b>NO11.5.</b> Estimate a solution to an addition or subtraction problem (e.g., “Is <math>9 + 9</math> closer to 10 or 20?”). <b>NO11.6.</b> Estimate a solution to a multiplication <b>and/or division</b> problem (e.g., “2 groups of 9 equal 18. Would 3 groups of 9 be closer to 20 or 30?”).</p>
	<p><b>E</b> Use proportional reasoning</p>	<p><b>Use equivalent ratios in real-life situations.</b></p> <p><b>NO12.1</b> Recognize real-life ratio situations with discrete models (e.g., 1 adult teacher for every 3 students, 1 sandwich to be shared with 2 people). <b>NO12.2</b> Show proportion using real-life situations (e.g., “1 candy bar costs \$0.50. What do 2 candy bars cost?”).</p>

**Strand 2: Measurement (Select 2 APIs)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p align="center"><b>1</b></p> <p>Understand measurable attributes of objects and the units, systems, and processes of measurement</p>	<p align="center"><b>A</b></p> <p>Determine unit of measurement</p>	<p><b>Justify and use the appropriate unit of measure (linear, time, weight).</b></p> <p><b>ME1.1.</b> Recognize, compare, and order attributes such as length and weight.</p> <ul style="list-style-type: none"> <li><b>a.</b> Compare and communicate the length of 2 objects directly, using words such as “bigger,” “smaller,” “longer,” “shorter,” and “taller.”</li> <li><b>b.</b> Compare and communicate the weight of 2 objects directly, using words such as “heavier,” and “lighter.”</li> <li><b>c.</b> Engage in experiences to connect number with length, using both conventional rulers and manipulative units that are standard units, such as centimeter cubes.</li> <li><b>d.</b> Engage in experiences to connect number with weight, using balance and spring scales.</li> <li><b>e.</b> Select and identify the appropriate tool for the attribute being measured.</li> <li><b>f.</b> <b>Show understanding of unit iteration for length measurement (e.g., placing units end to end in some manner, with no gaps).</b></li> <li><b>g.</b> <b>Use repetition of a single unit to measure something larger than the unit (e.g., measuring the length of the room with a single meter stick).</b></li> <li><b>h.</b> <b>Use appropriate unit for the attribute being measured.</b></li> </ul>
	<p align="center"><b>C</b></p> <p>Tell and use units of time</p>	<p>Tell time. Solve problems involving elapsed time (hours).</p> <p><b>ME2.1.</b> Develop concept of time.</p> <ul style="list-style-type: none"> <li><b>a.</b> Participate in calendar activities and start to identify days, months, and years.</li> <li><b>b.</b> Participate in daily schedules and start to identify important times in one’s day (e.g., identify what will be done before lunch).</li> <li><b>c.</b> Begin to describe passage of time using words such as “today,” “yesterday,” and “tomorrow.”</li> <li><b>d.</b> Start to understand that time is the duration of an event from beginning to end.</li> <li><b>e.</b> Describe passage of time by using a calendar to figure out how many more days until a special event (e.g., how many more days until a birthday).</li> </ul>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand measurable attributes of objects and the units, systems, and processes of measurement</p>	<p><b>C</b> Tell and use units of time</p>	<p>f. Identify or predict what comes next in a daily schedule.</p> <p>g. Develop concepts of “how long” for time units (e.g., seconds, minutes, and hours).</p> <p><b>ME2.2.</b> Develop ways to measure time.</p> <p>a. Listen to others “talk time” (e.g., “It is 2:30, time to get ready to go home.”).</p> <p>b. Time familiar events with a timer (e.g., brushing teeth, eating lunch).</p> <p>c. Identify actual time to the hour.</p> <p>d. Identify time for an event that is 1 hour away.</p> <p>e. Tell time.</p> <p>f. <b>Solve problems involving elapsed time (e.g., “If it was 7:30 when David left home, what time will he arrive at school if it takes him 1 hour to travel there?”).</b></p>
	<p><b>D</b> Count and compute money</p>	<p><b>Select coins and/or bills needed to make a purchase. Count coins up to \$1.00. Make change.</b></p> <p><b>ME3.1.</b> Identify coins.</p> <p>a. Match or identify a penny.</p> <p>b. Match or identify a nickel.</p> <p>c. Match or identify a dime.</p> <p>d. Match or identify a quarter.</p> <p><b>ME3.2.</b> Know the values of coins.</p> <p>a. Identify the value of a penny as 1¢.</p> <p>b. Identify the value of a nickel as 5 pennies.</p> <p>c. Identify the value of a dime as 10 pennies.</p> <p>d. Identify the value of a quarter as 25 pennies.</p> <p><b>ME3.3.</b> Count money.</p> <p>a. Demonstrate different kinds of counting (e.g., by 1s, by 5s, by 10s, by 25s).</p> <p>b. Add collections of like coins together to make a sum no greater than \$1.00 (e.g., 10 dimes, 4 quarters).</p> <p>c. Find possible combinations of coins to equal 25¢ and 50¢.</p> <p>d. <b>Match coin combinations to dollars and cents notation.</b></p> <p>e. <b>Add coins together to equal \$1.00.</b></p> <p>f. <b>Identify the value of the coins added to make \$1.00 as equaling 1 dollar bill.</b></p> <p>g. <b>Make change.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Understand measurable attributes of objects and the units, systems, and processes of measurement</p>	<p><b>D</b> Count and compute money</p>	<p><b>ME3.4.</b> Use money.</p> <p><b>a.</b> Select the coins and/or bills needed to make a purchase</p>
<p><b>2</b> Apply appropriate techniques, tools, and formulas to determine measurements</p>	<p><b>A</b> Use standard or non-standard measurement</p>	<p><b>Use tools to measure size, temperature, time, weight, and capacity to the nearest unit.</b></p> <p><b>ME4.1.</b> Recognize, compare, and order attributes such as length and weight.</p> <p><b>a.</b> Compare and communicate the length of 2 objects directly, using words such as “bigger,” “smaller,” “longer,” “shorter,” and “taller.”</p> <p><b>b.</b> Compare length transitively (e.g., the length of 2 objects can be compared by representing each using string or paper strips).</p> <p><b>c.</b> Compare and communicate the weight of 2 objects directly, using words such as “heavier,” and “lighter.”</p> <p><b>d.</b> Engage in experiences to connect number with length, using both conventional rulers and manipulative units that are standard units (e.g., centimeter cubes).</p> <p><b>e.</b> Engage in experiences to connect number with weight, using balance and spring scales.</p> <p><b>f.</b> Select and identify the appropriate tool for the attribute being measured.</p> <p><b>g.</b> Show understanding of unit iteration for length measurement (e.g., placing units end to end in some manner with no gaps).</p> <p><b>h.</b> Use repetition of a single unit to measure something larger than the unit (e.g., measuring the length of the room with a single meter stick).</p> <p><b>i.</b> Use the appropriate unit for the attribute being measured.</p> <p><b>ME4.2.</b> Use tools to measure size, temperature, time, weight, and capacity to the nearest unit.</p>



## Communication Arts API Glossary

- **Alliteration:** Repetition of the initial consonant sounds in stressed syllables or words in sequence; a “sound device.”
- **Approximation of letters:** “letter-like” marks by early writers when they are attempting to write text.
- **Audience:** The author’s awareness of audience: writing for a specific purpose with a specific reader or group of readers in mind.
- **Automaticity:** Automatic word recognition; the fast, effortless word recognition that comes with a great deal of reading practice (Emerging and Developing readers may be accurate, but slow and inefficient at word recognition. Continued reading practice helps word recognition become more automatic, rapid, and effortless. Automaticity refers only to accurate, speedy word recognition, not to reading with expression.).
- **Concept of print:** Conventions of print; the understanding an individual has about the accepted practices that govern the use of print and the written language (e.g., reading left to right and top to bottom, words are made of letters, use of spaces between words, use of upper- and lower-case letters spelling patterns, punctuation).
- **Context clues:** Information from the surrounding words, illustrations, or sentences that helps give meaning to a specific word or phrase.
- **Cueing systems:** Any of the various sources of information aiding in the identification of an unrecognized word and helping readers construct meaning from print (e.g., phonics, grammar, context, word parts, and text structure)
- **Digraph:** Two or more consonants that make one sound or phoneme (e.g., /ch/, /sh/, /tch/, /th/, /ps/).
- **Diphthong:** A complex vowel sound within a syllable (e.g., clown, boy).
- **Directionality:** The ability to accurately perceive spatial orientation of print (e.g., the print concept of reading from left to right and top to bottom).
- **Draft:** Writing ideas in a rough, unpolished form; the preliminary version of a piece of writing.
- **Environmental print:** Print and other graphic symbols, in addition to books, that are found in the physical environment.
- **Expository text:** Presents facts, opinions, definitions of terms, and examples to inform the reader about a specific topic.
- **Fiction:** Imaginative narrative in any form of presentation that is designed to entertain, as distinguished from that which is primarily designed to explain, argue, or merely describe (As a genre, fiction may include short stories, novella, novels, drama,, and narrative poetry.).
- **Fluency:** The ability to read a text accurately, quickly, and with proper expression and comprehension (Fluent readers do not have to concentrate on decoding words and can focus their attention on the meaning of the text.).
- **Graphic Organizer:** A visual device for organizing information around a concept, theme, or topic; includes, but is not limited to the following:
  - **Advance organizer:** Previews instruction and provides familiar concepts that connect and anchor the new learning

- **Chart:** Gives information, shows processes, or makes comparisons, often with pictures and symbols rather than with words
- **Cluster, concept map, or web:** Presents written ideas around a theme, characteristic, category, or word
- **Diagrams:** Shows how something works, how it is constructed, or how its parts relate to one another
- **Graph:** Presents information with lines, pictures, and symbols rather than words
- **Mind map:** Uses pictures and symbolic drawings rather than written words
- **Outline:** Organizes information into topics and subtopics with related details; topic outlines use words and phrases to describe key information; sentence outlines use complete sentences to list major points and supporting details
- **Venn diagram:** uses two overlapping circles to express similarities and differences in two things
- **High-frequency word:** Common words that appear often in written or spoken language (e.g., the, of, and, a, to, in, is, you)
- **Literacy-based materials:** Games, toys, or other projects that are used to increase literacy.
- **Literary devices:** The devices commonly used in literature to give added depth to a work (e.g., imagery, point of view, symbolism, and allusions).
- **Main idea:** The implicit or explicit message; what a text is “mostly about”; the theme of the text.
- **Mood:** The feeling created in the reader, evoked through the language of the text.
- **Narrative:** Tells a story (e.g., anecdote, autobiography, memoir).
- **Non-fiction:** Writing that concerns real events and is intended to explain, inform, persuade, or give directions (e.g., autobiography, biography, memoir, essay, workplace communications).
- **Onset and Rime:** Parts of monosyllabic words spoken in English. These units are smaller than syllables but may be larger than phonemes. An onset is the initial consonant sound of a syllable. The rime is the part of a syllable that contains the vowel and all that follows it.
- **Organizational strategy:** A means of structuring ideas and/or information; use of graphic organizers.
- **Persuasive writing:** Seeks to influence readers or listeners to agree with a perspective or perform an action (e.g., editorials, advertisements, persuasive essays and letters, public service announcements, position papers).
- **Phoneme:** Smallest part of spoken language that makes a difference in the meaning of words (English has approximately 41 phonemes. Some words, such as “a” or “oh,” have only one phoneme. The word “if” has two phonemes: /i/ and /f/. “Check” has three phonemes: /ch/ /e/ /k/. A phoneme may be represented by more than one letter.).
- **Phonemic awareness:** An awareness of the sounds that make up words (For example, beginning readers demonstrate phonemic awareness by combining or blending the separate sounds in a word to say the word: /c/ /a/ /t/ is spoken as “cat.”).
- **Phonics:** Phonic cues; instruction based on the alphabetic principle that there is a predictable relationship between phonemes (sounds in spoken language) and graphemes (letters that represent the sounds) that can be used to decode and read words.
- **Post-reading skills:** Strategies used to reflect on reading and integrate new information and concepts with previously learned understandings.

- **Predict:** To use context and content clues to anticipate what might happen next.
- **Pre-reading strategies:** Activities that take place before reading to access prior knowledge, preview text, assist the reader in predicting the text’s topic or main idea and set a purpose for reading.
- **Purpose:** Writing to explain or inform, to entertain, or to persuade.
- **Read-alouds:** Prose or poetry that is read aloud with students (Read aloud texts are generally at a higher reading level than the listener would be able to read and comprehend independently).
- **Rhyme:** Sound device marked by the repetition of identical or similar stressed sounds.
  - **Perfect or exact rhyme:** Differing consonant sounds followed by identical vowel sounds, as in “bee” and “see”.
  - **Approximate rhyme:** The final consonant sounds are identical, as in “trip” and “slap”.
  - **End rhyme:** The rhyming words occur at the end of the lines of poetry.
  - **Internal rhyme:** rhyming words occur within the lines of poetry.
- **Sensory details:** Details that appeal to the five senses and evoke images of how something looks, sounds, feels, tastes, or smells; sensory details may be literal (descriptive language) or figurative (imagery).
- **Story elements:** Basic parts of a story: setting, characters, plot, conflict point of view, and theme.
- **Text features:** Parts, other than the body of the text, that designate special features (e.g., title, author, copyright, dedication); text organizers that provide structure and help readers locate information (e.g., page numbers, table of contents, captions, glossary, index, illustrations, graphs, charts, etc.).
- **Visualize:** To picture the people, places, and/or actions that an author describes in text; a reading strategy to increase comprehension of text.
- **Vocabulary:** The body of words used in a particular language or in a particular sphere of activity; the body of words known to an individual person.

## Communication Arts Web Resources

The following websites have been recommended by educators and content consultants as resources to aid teachers in developing task/activity ideas.

[www.pbskids.org/lions](http://www.pbskids.org/lions)

[www.readthinkwrite.org](http://www.readthinkwrite.org)

[www.bookpop.com](http://www.bookpop.com)

[www.eduplace.com](http://www.eduplace.com)

[www.siforkids.com](http://www.siforkids.com)

[www.storylineonline.net](http://www.storylineonline.net)

[www.starfall.com](http://www.starfall.com)

## Communication Arts APIs

### Elementary – Grades 3, 4, & 5

Title of Strand	Grade Focus
<ul style="list-style-type: none"> <li>Reading: Develop and apply skills and strategies to the reading process (<b>RD</b> <i>and/or</i> <b>RP</b>)</li> </ul>	Required for Grades 3-8, 11
<ul style="list-style-type: none"> <li>Writing: Compose well-developed text using standard English conventions (<b>WC</b>)</li> </ul>	Required for Elementary Grades 3, 4, & 5

#### Strand 1: Reading

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1</b> Develop and apply skills and strategies to the reading process	<b>A</b> Print Concepts	<p>Demonstrate basic concepts of print.</p> <p><b>RD1.1.</b> Attend to literacy-based materials.</p> <p><b>RD1.2.</b> Understand print tells story by attending to and/or reading story.</p> <p><b>RD1.3.</b> Match objects to like objects.</p> <p><b>RD1.4.</b> Match objects to photographs of like objects.</p> <p><b>RD1.5.</b> Match objects to symbols (line drawings) of like objects (e.g., ball to circle).</p> <p><b>RD1.6.</b> Match objects to words.</p> <p><b>RD1.7.</b> Understand that a string of letters may represent words (print awareness).</p> <p><b>RD1.8.</b> Match letter to letter.</p> <p><b>RD1.9.</b> Match word to word.</p> <p><b>RD1.10.</b> <b>Match pictures to printed words to show printed words represent objects or pictures of object.</b></p> <p><b>RD1.11.</b> <b>Distinguish text from pictures.</b></p> <p><b>RD1.12.</b> <b>Illustrate words, caption pictures, act out words or sentences to show printed words represent objects.</b></p> <p><b>RD1.13.</b> Understand directionality (front to back, top to bottom, and left to right.)</p> <p><b>RD1.14.</b> <b>Identify the author.</b></p> <p><b>RD1.15.</b> Understand concept of title and/or know where title is located.</p> <p>Demonstrate understanding of letter concepts.</p> <p><b>RD1.17.</b> Identify uppercase and lowercase letters.</p> <p><b>RD1.18.</b> Understand the need for spaces between words.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>B</b> Phonemic Awareness</p>	<p>Discriminate sounds in words to achieve phonemic awareness.</p> <p><b>RD2.1.</b> Attend purposefully to reading of words or pictures/symbols/objects/actions.</p> <p><b>RD2.2.</b> Discriminate initial sounds of single-syllable words.</p> <p><b>RD2.3.</b> Discriminate final sounds of single-syllable words.</p> <p><b>RD2.4.</b> <b>Orally blend sounds to form words using onset and rime.</b></p> <p><b>RD2.5.</b> <b>Replace onset and rime to form new words.</b></p> <p><b>RD2.6.</b> Differentiate phonemes of multi-syllable words.</p> <p><b>RD2.7.</b> Recognize rhyming words in spoken language.</p> <p><b>RD2.8.</b> Imitate inflections/sounds/rhythm patterns.</p> <p><b>RD2.9.</b> <b>Produce rhyming words in spoken language.</b></p>
	<p><b>C</b> Phonics</p>	<p>Develop phonics knowledge (to lead to automaticity).</p> <p><b>RD3.1.</b> Demonstrate letter/sound relationships (individual letters and letter clusters).</p> <p><b>RD3.2.</b> Use letter sound association to read simple words.</p> <p><b>RD3.3.</b> <b>Use onset to decode unknown words.</b></p> <p><b>RD3.4.</b> <b>Use rime to decode unknown words.</b></p> <p><b>RD3.5.</b> <b>Attach sounds to groups of letter patterns.</b></p> <p><b>RD3.6.</b> <b>Blend sounds from string of separate syllables.</b></p> <p><b>RD3.7.</b> <b>Recognize consonant digraphs.</b></p> <p><b>RD3.8.</b> <b>Use invented spelling to demonstrate understanding of some word sounds.</b></p> <p><b>RD3.10.</b> <b>Use word patterns to decode unknown words.</b></p> <p>a. <b>compound words.</b></p>
	<p><b>D</b> Fluency</p>	<p>Read simple text (words/symbols/pictures/objects/actions)</p> <p><b>RD4.1.</b> containing a small bank of high-frequency words.</p> <p><b>RD4.2.</b> consisting of environmental print.</p> <p><b>RD4.6.</b> <b>applying rate for reading based on purpose.</b></p>
	<p><b>E</b> Vocabulary</p>	<p>Develop vocabulary by listening to, discussing, <b>and/or through the use of text</b> unknown words in stories, the environment, <b>and direct instruction.</b></p> <p><b>RD5.3.</b> Develop a store of key words (words/pictures/symbols/objects/actions) with personal meaning (e.g., mother, father, dog), <b>including environmental print.</b></p> <p><b>RD5.4.</b> <b>Know several pairs of high-frequency synonyms and antonyms (e.g., up/down, hot/cold, small/little).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>E</b> Vocabulary</p>	<p><b>RD5.6. Use context clues to predict words.</b>  <b>RD5.7. Use a basic dictionary and glossary (may be picture dictionary or personal dictionary).</b>  <b>RD5.8. Demonstrate use of common inflectional endings (e.g., “s” for plural nouns).</b></p>
	<p><b>F</b> Pre-Reading</p>	<p>Develop and apply pre-reading strategies to aid comprehension.</p> <p><b>RP1.1.</b> Attend to pictures in text.  <b>RP1.2.</b> Preview text and/or pictures.  <b>RP1.3.</b> Demonstrate understanding that pictures/symbols/objects/actions have meaning.  <b>RP1.4.</b> Access prior knowledge. (What do I know? [K-W-L] Informational passages only.)  <b>RP1.5.</b> Predict what storybook or article may be about, based on pictures/symbols/objects/actions, <b>with evidence.</b>  <b>RP1.7. Set a purpose for reading. (What do I want to know? [K-W-L] Informational passages only.)</b></p>
	<p><b>G</b> During Reading</p>	<p>During reading or read-alouds, develop and utilize strategies.</p> <p><b>RP2.1.</b> Attend to the reading of the story and to the pictures.  <b>RP2.2.</b> Predict and check.  <b>RP2.3.</b> Check content and process using cueing systems.              <b>a.</b> Meaning: Does the word make sense?              <b>b.</b> Structure: Does the word sound right?              <b>c.</b> Visual: Does the word look right?  <b>RP2.4. Self-question and correct: who, what, where, when, why, and how?</b>  <b>RP2.6. Visualize. (e.g., What does something important in the story or article, not depicted in illustrations, look like?)</b></p>
	<p><b>H</b> Post-Reading</p>	<p>Develop and demonstrate post-reading skills after reading or read-alouds to react to text through vocalizations, words, or symbols in order to identify main ideas and supporting details.</p> <p><b>RP3.1.</b> React to story using vocalizations/gestures/words.  <b>RP3.2.</b> Question to clarify understanding: Who, what, when, where, and why?  <b>RP3.3.</b> Recount <b>beginning, middle, and end of story.</b>  <b>RP3.4. Identify main idea(s) of nonfiction.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1</b> Develop and apply skills and strategies to the reading process	<b>H</b> Post-Reading	<b>RP3.5.</b> Illustrate story by using pictures/symbols/objects/actions. <b>RP3.6.</b> Re-enact story by using pictures/symbols/objects/actions. <b>RP3.7.</b> <b>Re ect (e.g., Tell, write, or sign one thing you have learned. [non ction] Did the character do what you expected? [ ction])</b>
	<b>I</b> Making Connections	Identify connections. <b>RP4.1.</b> Identify similarities between text ideas and own experiences. <b>RP4.2.</b> Identify differences between text ideas and own experiences. <b>RP4.3.</b> <b>Identify similarities and differences between fiction and nonfiction (real vs. make-believe).</b> <b>RP4.4.</b> <b>Differentiate text ideas and the real world.</b>

**Strand 2: Writing** (Select 2 APIs)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>2</b> Compose well-developed text using standard English conventions	<b>A</b> Handwriting	Print letters legibly, using left-to-right, top-to-bottom directionality and correct spacing between letters and words. <b>WC1.1.</b> Explore and/or use writing tools (e.g., pencils, keyboard, stamps). <b>WC1.2.</b> Use scribbles or approximations of letters to represent written language. <b>WC1.3.</b> Imitate pre-writing strokes. <b>WC1.4.</b> <b>Form uppercase and lowercase letters.</b> <b>WC1.5.</b> <b>Space appropriately between words.</b> <b>WC1.6.</b> <b>Leave margins: right and left, top and bottom.</b>
	<b>B</b> Capitalization	Capitalize first letters. <b>WC2.1.</b> Explore use of capitalization. <b>WC2.2.</b> Capitalize first letters of own first and last names. <b>WC2.3.</b> <b>Capitalize personal information.</b> <b>WC2.4.</b> <b>Capitalize names of people, days, and months.</b> <b>WC2.6.</b> <b>Capitalize beginning words of sentences.</b>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2</b> Compose well-developed text using standard English conventions</p>	<p><b>C</b> Punctuation</p>	<p>Compose text through words/pictures/symbols/objects/actions using correct end punctuation.</p> <p><b>WC3.1.</b> Attend to punctuation marks.  <b>WC3.2.</b> Identify punctuation marks (. ?).  <b>WC3.3.</b> Use punctuation marks (. ?).  <b>WC3.4.</b> <b>Use commas in personal information.</b>  <b>WC3.5.</b> <b>Compose text using correct end punctuation in interrogative sentences.</b></p>
	<p><b>E</b> Spelling</p>	<p>In writing, use correct spelling.</p> <p><b>WC4.1.</b> Use correct spelling of own first and last names, and/or personal information.  <b>WC4.2.</b> Use phonetic spelling of initial sounds in writing personal information.  <b>WC4.3.</b> <b>Use phonetic spelling of initial sounds of key words.</b></p>
	<p><b>F</b> Sentence Construction</p>	<p>In composing text (words/pictures/symbols/objects/actions), write sentences.</p> <p><b>WC5.1.</b> Use <b>phrases and/or sentences</b> to convey a thought.  <b>WC5.2.</b> Imitate words in sentences.  <b>WC5.3.</b> <b>Use declarative and/or interrogative sentences.</b></p>

# Communication Arts APIs

## Middle School – Grades 6, 7, & 8

Title of Strand	Grade Focus
<ul style="list-style-type: none"> <li>Reading: Develop and apply skills and strategies to the reading process (<b>RD</b> <i>and/or</i> <b>RP</b>)</li> </ul>	Required for Grades 3-8, 11
<ul style="list-style-type: none"> <li>Writing: Apply a writing process in composing text or write effectively in various forms and types of writing (<b>WP</b>)</li> </ul>	Required for Middle School and High School Grades 6, 7, 8, & 11

### Strand 1: Reading (Select 2 APIs )

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1</b> Develop and apply skills and strategies to the reading process	<b>A</b> Print Concepts	Demonstrate basic concepts of print. <b>RD1.1.</b> Attend to literacy-based materials. <b>RD1.2.</b> Understand print tells story by attending to and/or reading story. <b>RD1.3.</b> Match objects to like objects. <b>RD1.4.</b> Match objects to photographs of like objects. <b>RD1.5.</b> Match objects to symbols (line drawings) of like objects (e.g., ball to circle). <b>RD1.6.</b> Match objects to words. <b>RD1.7.</b> Understand that a string of letters may represent words (print awareness). <b>RD1.8.</b> Match letter to letter. <b>RD1.9.</b> Match word to word. <b>RD1.10.</b> Match pictures to printed words to show printed words represent objects or pictures of objects. <b>RD1.11.</b> Distinguish text from pictures. <b>RD1.12.</b> Illustrate words, caption pictures, act out words or sentences to show printed words represent objects. <b>RD1.13.</b> Understand directionality front to back, top to bottom, and left to right. <b>RD1.14.</b> Identify the author. <b>RD1.15.</b> Understand concept of title and know where title is located. <b>RD1.16.</b> <b>Understand punctuation has meaning.</b>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>A</b> Print Concepts</p>	<p>Demonstrate understanding of letter concepts.  <b>RD1.17.</b> Identify uppercase and lowercase letters.  <b>RD1.18.</b> Understand the need for spaces between words.</p>
	<p><b>B</b> Phonemic Awareness</p>	<p>Discriminate sounds in words to achieve phonemic awareness.  <b>RD2.1.</b> Attend purposefully to reading of words or pictures/symbols/objects/actions.  <b>RD2.2.</b> Discriminate initial sounds of single-syllable words.  <b>RD2.3.</b> Discriminate final sounds of single-syllable words.  <b>RD2.4.</b> Orally blend sounds to form words using onset and rime.  <b>RD2.5.</b> Replace onset and rime to form new words.  <b>RD2.6.</b> Differentiate phonemes of multi-syllable words.  <b>RD2.7.</b> Recognize rhyming words in spoken language.  <b>RD2.8.</b> Imitate inflections/sounds/rhythm patterns.  <b>RD2.9.</b> Produce rhyming words in spoken language.</p>
	<p><b>C</b> Phonics</p>	<p>Develop phonics knowledge (to lead to automaticity).  <b>RD3.1.</b> Demonstrate letter/sound relationships (individual letters and letter clusters).  <b>RD3.2.</b> Use letter/sound association to read simple words.  <b>RD3.3.</b> Use onset to decode unknown words.  <b>RD3.4.</b> Use rime to decode unknown words.  <b>RD3.5.</b> Attach sounds to groups of letter patterns.  <b>RD3.6.</b> Blend sounds from string of separate syllables.  <b>RD3.7.</b> Recognize consonant digraphs.  <b>RD3.8.</b> Use invented spelling to demonstrate understanding of some word sounds.  <b>RD3.9. Demonstrate conceptual understanding of common prefixes (e.g., re-turn, not ret-urn).</b>  <b>RD3.10.</b> Use word patterns to decode unknown words.              a. compound words              b. <b>short vowels</b>              c. <b>long vowel silent e</b>              d. <b>vowel pairs</b>              e. <b>diphthongs</b>              f. <b>in unctional endings</b>  <b>RD3.11. Demonstrate conceptual understanding of common suffixes.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>D</b> Fluency</p>	<p>Read simple text (words/pictures/symbols/objects/actions)</p> <p><b>RD4.1.</b> containing a small bank of high-frequency words</p> <p><b>RD4.2.</b> consisting of environmental print.</p> <p><b>RD4.3. developing automaticity of an increasing core of high-frequency words.</b></p> <p><b>RD4.4. using intonation/appropriate phrasing and expression.</b></p> <p><b>RD4.5. acknowledging punctuation by pauses or intonation.</b></p> <p><b>RD4.6.</b> applying a rate for reading based on purpose.</p>
	<p><b>E</b> Vocabulary</p>	<p>Develop vocabulary by listening to, discussing, and/or through the use of text unknown words in stories, in the environment, and direct instruction.</p> <p><b>RD5.1. Use base words (e.g., common roots, homophones, homographs).</b></p> <p><b>RD5.2. Use classroom resources (content texts, ashcards, etc.).</b></p> <p><b>RD5.3.</b> Develop a store of key words (words/pictures/symbols/objects/actions) with personal meaning (e.g., mother, father, dog), including environmental print.</p> <p><b>RD5.4.</b> Know several pairs of high-frequency synonyms and antonyms (e.g., up/down, hot/cold, small/little).</p> <p><b>RD5.6.</b> Use context clues <b>to learn new vocabulary.</b></p> <p><b>RD5.7.</b> Use a basic dictionary and glossary (may be picture dictionary or personal dictionary).</p> <p><b>RD5.8.</b> Demonstrate use of common inflectional endings (e.g., “s” for plural nouns <b>or “ed” for past tense verbs</b>).</p> <p><b>RD5.9. Demonstrate understanding of common pre zes.</b></p> <p><b>RD5.10. Demonstrate understanding of common suf zes.</b></p> <p><b>RD5.11. Use meaningful parts to determine word meaning.</b></p>
	<p><b>F</b> Pre-Reading</p>	<p>Develop and apply pre-reading strategies to aid comprehension.</p> <p><b>RP1.1.</b> Attend to pictures in text.</p> <p><b>RP1.2.</b> Preview text and/or pictures.</p> <p><b>RP1.3.</b> Demonstrate understanding that pictures/symbols/objects/actions have meaning.</p> <p><b>RP1.4.</b> Access prior knowledge. (What do I know? [K-W-L] Informational passages only.)</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>F</b> Pre-Reading</p>	<p><b>RP1.5.</b> Predict what storybook or article may be about based on pictures/symbols/objects/actions, with evidence.</p> <p><b>RP1.7.</b> Set a purpose for reading. (What do I want to know? [K-W-L] Informational passages only.)</p>
	<p><b>G</b> During Reading</p>	<p>During reading, develop and utilize strategies.</p> <p><b>RP2.1.</b> Attend to the reading of the story and to the pictures.</p> <p><b>RP2.3. Predict and</b> check content and process using cueing systems.</p> <p><b>a.</b> Meaning: Does the word make sense?</p> <p><b>b.</b> Structure: Does the word sound right?</p> <p><b>c.</b> Visual: Does the word look right?</p> <p><b>RP2.4.</b> Self-question and correct: who, what, where, when, why, and how?</p> <p><b>RP2.6.</b> Visualize. (e.g., What does something important in the story or article, not depicted in illustrations, look like?)</p>
	<p><b>H</b> Post-Reading</p>	<p>Develop and demonstrate post-reading skills after reading or read-alouds to react to text through vocalizations, words, or symbols in order to identify main ideas and supporting details.</p> <p><b>RP3.1.</b> React to story using vocalizations/gestures/words.</p> <p><b>RP3.2.</b> Question to clarify understanding: Who, what, when, where, and why?</p> <p><b>RP3.3.</b> Recount beginning, middle, and end of story.</p> <p><b>RP3.4.</b> Identify main idea(s) of nonfiction.</p> <p><b>RP3.5.</b> Illustrate story by using pictures/symbols/objects/actions.</p> <p><b>RP3.6.</b> Re-enact story by using pictures/symbols/objects/actions.</p> <p><b>RP3.7.</b> Reflect (e.g., Tell, write, or sign one thing that you have learned. [nonfiction] Did the character do what you expected? [fiction])</p> <p><b>RP3.8. Draw conclusions. (e.g., Why did something in the story happen? What was the cause of...? Based on information in the article, what is your opinion?).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>I</b> Making Connections</p>	<p>Identify <b>and/or explain</b> connections.</p> <p><b>RP4.1.</b> Identify similarities between text ideas and own experiences.</p> <p><b>RP4.2.</b> Identify differences between text ideas and own experiences.</p> <p><b>RP4.3.</b> Identify similarities and differences between fiction and nonfiction (real vs. make-believe).</p> <p><b>RP4.4.</b> Differentiate text ideas and the real world.</p> <p><b>RP4.5.</b> <b>Respond to and/or explain how text reflects a culture and/or historic timeframe.</b></p>

**Strand 2: Writing (Select 2 APIs )**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Apply a writing process in composing text</p>	<p><b>A</b> Writing Process</p>	<p>Follow a writing process through words/pictures/symbols/objects/actions.</p> <p><b>WP1.1.</b> Brainstorm ideas and/or make choices regarding writing topics.</p> <p><b>WP1.2.</b> Explore a variety of graphic organizers and their purposes.</p> <p><b>WP1.3.</b> Use a simple graphic organizer.</p> <p><b>WP1.4.</b> Use spelling approximations.</p> <p><b>WP1.5.</b> Generate a draft.</p> <p><b>WP1.6.</b> Revise draft.</p> <p><b>WP1.7.</b> Edit text, including capitalization and punctuation.</p> <p><b>WP1.8.</b> Publish or share stories (e.g., share story with a friend, hang up picture story on a bulletin board).</p>
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>A</b> Narrative and Descriptive Writing</p>	<p>Tell and/or write stories about familiar experiences and events using words/pictures/symbols/objects/actions.</p> <p><b>WP2.1.</b> Plan story with a beginning using personal experiences</p> <p><b>WP2.2.</b> Tell story with three related ideas/phrases, including beginning, middle, and end.</p> <p><b>WP2.3.</b> Relate a series of events in chronological order, including beginning and end.</p> <p><b>WP2.4.</b> Add details to the middle of a story.</p> <p><b>WP2.5.</b> Include a character in a story.</p> <p><b>WP2.6.</b> Include a setting in a story.</p> <p><b>WP2.8.</b> <b>Write a story focusing on a single event.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>A</b> Narrative and Descriptive Writing</p>	<p>Describe a familiar object, person, character, place, and/or event using words/pictures/symbols/objects/actions.</p> <p><b>WP2.9.</b> Attend to descriptions of objects.</p> <p><b>WP2.10.</b> Use color, shape, size, and time to describe the object, person, character, place, and/or event.</p> <p><b>WP2.11.</b> Explore sensory details.</p> <p><b>WP2.12.</b> Explore various objects with a variety of sensory details.</p> <p><b>WP2.13.</b> <b>Use sensory details to describe the object, person, character, place, and/or event.</b></p> <p><b>WP2.14.</b> Describe differences using color, shape, and size.</p>
	<p><b>C</b> Expository and Persuasive Writing</p>	<p>Express an idea using words/pictures/symbols/objects/actions, including factual information.</p> <p><b>WP3.1.</b> Express wants or needs.</p> <p><b>WP3.2.</b> Express feelings of pleasure and/or displeasure using words/pictures/symbols/objects/actions.</p> <p><b>WP3.3.</b> Record important points in written text or real events that the student has experienced.</p> <p>a. Provide one or more supporting or descriptive details.</p> <p><b>WP3.4.</b> <b>Write directions using words/pictures/symbols/objects/actions.</b></p> <p><b>WP3.5.</b> <b>Write an expository text using words/pictures/symbols/objects/actions.</b></p> <p>a. Provide one main idea in a topic sentence.</p> <p>b. Provide three or more supporting details.</p> <p><b>WP3.6.</b> <b>Write a persuasive (why/because) text using words/pictures/symbols/objects/actions.</b></p> <p>a. Provide one main idea in a topic sentence.</p>
	<p><b>D</b> Summary Writing</p>	<p><b>Write a summary of or retell a short text using words/pictures/symbols/objects/actions.</b></p> <p><b>WP4.1.</b> Identify the most important parts.</p> <p><b>WP4.2.</b> Recognize that information has main ideas and supporting details in oral/written texts.</p> <p><b>WP4.3.</b> Separate the main ideas from supporting details.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>E</b> Audience and Purpose</p>	<p><b>Develop an awareness of audience and purpose in composing text.</b></p> <p><b>WP5.1.</b> Identify who the writing is for.</p> <p><b>WP5.2.</b> Identify reason for writing.</p> <p><b>WP5.3.</b> Identify appropriate format (e.g., friendly letters, thank-you notes, lists, messages, journals).</p> <p><b>WP5.4.</b> Write simple friendly letters, messages, and directions for making or doing something, considering a given audience.</p> <p><b>WP5.5.</b> Using words/pictures/symbols/objects/actions, write notes to self in response to others' interactions.</p> <p><b>a. Provide one main idea in a topic sentence.</b></p>

# Communication Arts APIs

## High School – Grade 11

Title of Strand	Grade Focus
<ul style="list-style-type: none"> <li>Reading: Develop and apply skills and strategies to the reading process (<b>RD</b> <i>and/or</i> <b>RP</b>)</li> </ul>	Required for Grades 3-8, 11
<ul style="list-style-type: none"> <li>Writing: Apply a writing process in composing text or write effectively in various forms and types of writing (<b>WP</b>)</li> </ul>	Required for Middle School and High School Grades 6, 7, 8, & 11

### Strand 1: Reading (Select 2 APIs )

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1</b> Develop and apply skills and strategies to the reading process	<b>A</b> Print Concepts	Demonstrate basic concepts of print. <b>RD1.1.</b> Attend to literacy-based materials. <b>RD1.2.</b> Understand print tells story by attending to and/or reading story. <b>RD1.3.</b> Match objects to like objects. <b>RD1.4.</b> Match objects to photographs of like objects. <b>RD1.5.</b> Match objects to symbols (line drawings) of like objects (e.g., ball to circle). <b>RD1.6.</b> Match objects to words. <b>RD1.7.</b> Understand that a string of letters may represent words (print awareness). <b>RD1.8.</b> Match letter to letter. <b>RD1.9.</b> Match word to word. <b>RD1.10.</b> Match pictures to printed words to show printed words represent objects or pictures of objects. <b>RD1.11.</b> Distinguish text from pictures. <b>RD1.12.</b> Illustrate words, caption pictures, act out words or sentences to show printed words represent objects. <b>RD1.13.</b> Understand directionality front to back, top to bottom, and left to right. <b>RD1.14.</b> Identify the author. <b>RD1.15.</b> Understand concept of title and know where title is located. <b>RD1.16.</b> Understand punctuation has meaning. Demonstrate understanding of letter concepts. <b>RD1.17.</b> Identify uppercase and lowercase letters. <b>RD1.18.</b> Understand the need for spaces between words.

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>B</b> Phonemic Awareness</p>	<p>Discriminate sounds in words to achieve phonemic awareness.</p> <p><b>RD2.1.</b> Attend purposefully to reading of words or pictures/symbols/objects/actions.</p> <p><b>RD2.2.</b> Discriminate initial sounds of single-syllable words.</p> <p><b>RD2.3.</b> Discriminate final sounds of single-syllable words.</p> <p><b>RD2.4.</b> Orally blend sounds to form words using onset and rime.</p> <p><b>RD2.5.</b> Replace onset and rime to form new words.</p> <p><b>RD2.6.</b> Differentiate phonemes of multi-syllable words.</p> <p><b>RD2.7.</b> Recognize rhyming words in spoken language.</p> <p><b>RD2.8.</b> Imitate inflections/sounds/rhythm patterns.</p> <p><b>RD2.9.</b> Produce rhyming words in spoken language.</p>
	<p><b>C</b> Phonics</p>	<p>Develop phonics knowledge (to lead to automaticity).</p> <p><b>RD3.1.</b> Demonstrate letter/sound relationships (individual letters and letter clusters).</p> <p><b>RD3.2.</b> Use letter/sound association to read simple words.</p> <p><b>RD3.3.</b> Use onset to decode unknown words.</p> <p><b>RD3.4.</b> Use rime to decode unknown words.</p> <p><b>RD3.5.</b> Attach sounds to groups of letter patterns.</p> <p><b>RD3.6.</b> Blend sounds from string of separate syllables.</p> <p><b>RD3.7.</b> Recognize consonant digraphs.</p> <p><b>RD3.8.</b> Use invented spelling to demonstrate understanding of some word sounds.</p> <p><b>RD3.9.</b> Demonstrate conceptual understanding of common prefixes (e.g., re-turn, not ret-urn).</p> <p><b>RD3.10.</b> Use word patterns to decode unknown words.</p> <ol style="list-style-type: none"> <li>a. compound words</li> <li>b. short vowels</li> <li>c. long vowel silent e</li> <li>d. vowel pairs</li> <li>e. diphthongs</li> <li>f. inflectional endings</li> </ol> <p><b>RD3.11.</b> Demonstrate conceptual understanding of common suffixes.</p> <p><b>RD3.12.</b> <b>Use the three cueing systems (meaning, syntax, phonics) to predict words.</b></p> <p><b>RD3.13.</b> <b>Confirm reading of a word by looking at its parts.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>D</b> Fluency</p>	<p>Read simple text (words/pictures/symbols/objects/actions)</p> <p><b>RD4.1.</b> containing a small bank of high-frequency words.  <b>RD4.2.</b> consisting of environmental print.  <b>RD4.3.</b> developing automaticity of an increasing core of high-frequency words.  <b>RD4.4.</b> using intonation/appropriate phrasing and expression.  <b>RD4.5.</b> acknowledging punctuation by pauses or intonation.  <b>RD4.6.</b> applying a rate for reading based on purpose.</p>
	<p><b>E</b> Vocabulary</p>	<p>Develop vocabulary by listening, discussing, and/or through the use of text unknown words in stories, the environment, and direct instruction.</p> <p><b>RD5.1.</b> Use base words (e.g., common roots, homophones, homographs).  <b>RD5.2.</b> Use classroom resources (content texts, flashcards, etc.).  <b>RD5.3.</b> Develop a store of key words (words/pictures/symbols/objects/actions) with personal meaning (e.g., mother, father, dog), including environmental print.  <b>RD5.4.</b> Know several pairs of high-frequency synonyms and antonyms (e.g., up/down, hot/cold, small/little).  <b>RD5.5. Know high-frequency synonyms and antonyms.</b>  <b>RD5.6.</b> Use context clues to learn new vocabulary.  <b>RD5.7.</b> Use a basic dictionary and glossary (may be picture dictionary or personal dictionary).  <b>RD5.8. Apply common</b> inflectional endings.  <b>RD5.9.</b> Demonstrate <b>use</b> of common prefixes.  <b>RD5.10.</b> Demonstrate <b>use</b> of common suffixes.  <b>RD5.11.</b> Use meaningful parts to determine word meaning.  <b>RD5.12. Develop vocabulary by applying knowledge of common roots and prexes.</b></p>
	<p><b>F</b> Pre-Reading</p>	<p>Develop and apply pre-reading strategies to aid comprehension.</p> <p><b>RP1.1.</b> Attend to pictures in text.  <b>RP1.2.</b> Preview text and/or pictures.  <b>RP1.3.</b> Demonstrate understanding that pictures/symbols/objects/actions have meaning.  <b>RP1.4.</b> Access prior knowledge. (What do I know? [K-W-L] Informational passages only.)  <b>RP1.5.</b> Predict what storybook or article may be about based on pictures/symbols/objects/actions, with evidence.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>F</b> Pre-Reading</p>	<p><b>RP1.6. Predict and confirm or reject.</b>  <b>RP1.7.</b> Set a purpose for reading. (What do I want to know? [K-W-L] Informational passages only.)</p>
	<p><b>G</b> During Reading</p>	<p>During reading, develop and utilize strategies.  <b>RP2.1.</b> Attend to the reading of the story and to the pictures.  <b>RP2.3.</b> Predict and check content and process using cueing systems.            <b>a.</b> Meaning: Does the word make sense?            <b>b.</b> Structure: Does the word sound right?            <b>c.</b> Visual: Does the word look right?  <b>RP2.4.</b> Self-question and correct: who, what, where, when, why, and how?  <b>RP2.5. Infer. (Why do you think the character did...? What caused this effect?).</b>  <b>RP2.6.</b> Visualize. (e.g., What does something important in the story or article, not depicted in illustrations, look like?)</p>
	<p><b>H</b> Post Reading</p>	<p>Develop and demonstrate post-reading skills after reading or read-alouds to react to text through vocalizations, words, or symbols in order to identify main ideas and supporting details.  <b>RP3.1.</b> React to story using vocalizations/gestures/words.  <b>RP3.2.</b> Question to clarify understanding: Who, what, when, where, and why?  <b>RP3.3.</b> Recount beginning, middle, and end of story.  <b>RP3.4.</b> Identify main idea(s) of nonfiction.  <b>RP3.5.</b> Illustrate story by using pictures/symbols/objects/actions.  <b>RP3.6.</b> Re-enact story by using pictures/symbols/objects/actions.  <b>RP3.7.</b> Reflect (e.g., Tell, write, or sign one thing that you have learned. [nonfiction] Did the character do what you expected? [fiction])  <b>RP3.8.</b> Draw conclusions. (e.g., Why did something in the story happen? What was the cause of...? Based on information in the article, what is your opinion?).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Develop and apply skills and strategies to the reading process</p>	<p><b>I</b> Making Connections</p>	<p>Identify and/or explain connections.</p> <p><b>RP4.1.</b> Identify similarities between text ideas and own experiences.</p> <p><b>RP4.2.</b> Identify differences between text ideas and own experiences.</p> <p><b>RP4.3.</b> Identify similarities and differences between fiction and nonfiction (real vs. make-believe).</p> <p><b>RP4.4.</b> Differentiate text ideas and the real world.</p> <p><b>RP4.5.</b> Respond to and/or explain how text reflects a culture and/or historic timeframe.</p> <p><b>RP4.6.</b> <b>Analyze the relationships between text ideas and the real world.</b></p>

**Strand 2: Writing (Select 2 APIs )**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1</b> Apply a writing process in composing text</p>	<p><b>A</b> Writing Process</p>	<p><b>Routinely</b> follow a writing process through words/pictures/symbols/objects/actions.</p> <p><b>WP1.1.</b> Brainstorm ideas and/or make choices regarding writing topics.</p> <p><b>WP1.2.</b> Explore a variety of graphic organizers and their purposes.</p> <p><b>WP1.3.</b> Use a simple graphic organizer.</p> <p><b>WP1.4.</b> Use spelling approximations.</p> <p><b>WP1.5.</b> Generate a draft.</p> <p><b>WP1.6.</b> Revise draft.</p> <p><b>WP1.7.</b> Edit text, including capitalization and punctuation.</p> <p><b>WP1.8.</b> Publish or share stories (e.g., share story with a friend, hang up picture story on a bulletin board).</p>
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>A</b> Narrative and Descriptive Writing</p>	<p>Tell and/or write stories about familiar experiences and events using words/pictures/symbols/objects/actions.</p> <p><b>WP2.1.</b> Plan story with a beginning using personal experiences</p> <p><b>WP2.2.</b> Tell story with three related ideas/phrases, including beginning, middle, and end.</p> <p><b>WP2.3.</b> Relate a series of events in chronological order, including beginning and end.</p> <p><b>WP2.4.</b> Add details to the middle of a story.</p> <p><b>WP2.5.</b> Include a character in a story.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>A</b> Narrative and Descriptive Writing</p>	<p><b>WP2.6.</b> Include a setting in a story.  <b>WP2.7. Include a problem and/or solution in a story.</b>  <b>WP2.8.</b> Write a story focusing on a single event.  Describe a familiar <b>and/or unfamiliar</b> object, person, character, place, and/or event using words/pictures/symbols/objects/actions.  <b>WP2.9.</b> Attend to descriptions of objects.  <b>WP2.10.</b> Use color, shape, size, and time to describe the object, person, character, place, and/or event.  <b>WP2.11.</b> Explore sensory details.  <b>WP2.12.</b> Explore various objects with a variety of sensory details.  <b>WP2.13.</b> Use sensory details to describe the object, person, character, place, and/or event.  <b>WP2.14.</b> Describe differences using color, shape, and size.</p>
	<p><b>C</b> Expository and Persuasive Writing</p>	<p>Express an idea using words/pictures/symbols/objects/actions, including factual information.  <b>WP3.1.</b> Express wants or needs.  <b>WP3.2.</b> Express feelings of pleasure and/or displeasure using words/pictures/symbols/objects/actions.  <b>WP3.3.</b> Record important points in written text or real events that the student has experienced.  a. Provide one or more supporting or descriptive details.  <b>WP3.4.</b> Write directions using words/pictures/symbols/objects/actions.  <b>WP3.5.</b> Write an expository text using words/pictures/symbols/objects/actions.  a. Provide one main idea in a topic sentence.  b. Provide three or more supporting details.  <b>WP3.6.</b> Write a persuasive (why/because) text using words/pictures/symbols/objects/actions.  a. Provide one main idea in a topic sentence.</p>
	<p><b>D</b> Summary Writing</p>	<p>Write a summary of or retell a short text using words/pictures/symbols/objects/actions.  <b>WP4.1.</b> Identify the most important parts.  <b>WP4.2.</b> Recognize information has main ideas and supporting details in oral/written texts.  <b>WP4.3.</b> Separate the main ideas from supporting details.  <b>WP4.4. Using words/pictures/symbols/objects/actions, write the main ideas in summary form.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3</b> Write effectively in various forms and types of writing</p>	<p><b>E</b> Audience and Purpose</p>	<p>Develop an awareness of audience and purpose in composing text.</p> <p><b>WP5.1.</b> Identify who the writing is for.</p> <p><b>WP5.2.</b> Identify reason for writing.</p> <p><b>WP5.3.</b> Identify appropriate format (e.g., friendly letters, thank-you notes, lists, messages, journals).</p> <p><b>WP5.4.</b> Write simple friendly letters, messages, and directions for making or doing something, considering a given audience.</p> <p><b>WP5.5.</b> Using words/pictures/symbols/objects/actions, write notes to self in response to others' interactions.</p> <ul style="list-style-type: none"> <li>a. Provide one main idea in a topic sentence.</li> <li>b. <b>Provide one or more supporting details.</b></li> </ul>



# Science API Glossary

- **Abiotic:** pertaining to the non-living part of the environment.
- **Adaptation:** the development of physical and behavioral characteristics that allow organisms to survive and reproduce in their habitats.
- **Asexual reproduction:** reproduction that does not include the union of sex cells and in which one parent produces offspring that are genetically identical to the parent.
- **Atmosphere (air):** consists of all the gaseous matter enveloping and surrounding Earth.
- **Balance:** an instrument used to measure the mass of an object.
- **Biodiversity:** the number and variety of organisms found in a particular habitat or ecosystem.
- **Biotic:** pertaining to the living part of the environment.
- **Carnivores:** meat eaters.
- **Cell:** the basic building block for all organisms.
- **Chemical change:** when one or more substances are changed into new substance(s) with new and different properties.
- **Circulatory system:** a collection of organs (e.g., heart, arteries, veins) that move blood throughout an organism.
- **Community:** a group of plants and animals living and interacting with one another in the same ecosystem.
- **Condensation:** the physical change of matter going from a gaseous state to a liquid state.
- **Consumer:** an organism that feeds on other organisms or on material derived from them.
- **Crescent moon:** as being observed on Earth less than half of the Moon is reflecting light.
- **Decomposer:** an organism, especially a bacterium or fungus that causes organic matter to rot or decay.
- **Deposition:** when transported earth materials are dropped in another location.
- **Displacement:** the weight or volume of fluid displaced by a floating or submerged body.
- **Ecosystem:** a localized group of interdependent organisms together with the environment that they inhabit and depend on.
- **Electromagnetic spectrum:** energy in wave form that can be transmitted through a vacuum or different medium.
- **Erosion:** movement of weathered rock and soil.
- **Evaporation:** the process by which a liquid becomes a gas (vapor).
- **Fission:** an asexual reproductive process in which a unicellular organism divides into two or more independently maturing daughter cells.
- **Food chain:** a hierarchy of different living things, each of which feeds on the one below.
- **Food web:** the interlinking food chains within an ecological community.
- **Force:** a quantity that produces an acceleration in the direction of its application; it is directly proportional to mass and acceleration ( $F = M \times A$ ).
- **Fossil:** the traces or remains of an animal or plant preserved from an earlier era inside a rock or other geological deposit, often as an impression or in a petrified state.
- **Friction:** a force that resists the relative motion or tendency to such motion of two bodies in contact.
- **Full moon:** the entire face of the Moon is reflecting light as being observed on Earth.
- **Gas:** matter that has no definite shape or volume.

- **Genetic information:** hereditary information that is unique to an organism and is stored in sequences within DNA molecules.
- **Geosphere (land):** also known as lithosphere, the outer part of the Earth that is solid, consisting of the crust and upper mantle.
- **Gibbous moon:** more than half of the Moon as being observed on Earth is reflecting light.
- **Gravity:** a force that acts to pull objects together.
- **Habitat:** part of an ecosystem where organisms get food and shelter.
- **Herbivores:** plant eaters.
- **Hibernation:** a sleeplike dormant state over the winter during which an organism lives off reserves of body fat, with a decrease in body temperature and pulse rate and slower metabolism.
- **Humidity:** amount of water vapor in the atmosphere.
- **Hydrosphere (water):** consists of all the water (solid, liquid, and gas) on Earth.
- **Igneous rock:** a rock that forms when melted rock (lava or magma) cools and crystallizes.
- **Life cycle:** the complete process of change and development during an organism's lifetime.
- **Liquid:** matter that has a definite volume but takes the shape of the container holding it.
- **Living:** anything that utilizes energy to grow, respond to stimuli, move, respire, and eliminate waste.
- **Lunar eclipse:** the Moon appears dark when sunlight is blocked by Earth.
- **Mass:** the amount of matter in something.
- **Matter:** anything that has mass and takes up space.
- **Metamorphic rock:** a rock that forms when other rocks are changed by intense heat and pressure.
- **Metamorphosis:** to undergo a complete or marked change of bodily form while developing into an adult animal.
- **Migration:** the seasonal movement of organisms from one location to another.
- **Mixture:** a combination of two or more substances that are not combined chemically but can be separated by physical means (e.g., beach sand, peas and carrots).
- **Moon phases:** shapes of the light-reflecting part of the Moon as being observed on Earth.
- **Natural selection:** changes in a population as a response to changes in their environment over time.
- **Non-living:** anything that does not (or never did) exhibit the characteristics of living things.
- **Offspring:** the descendants of organisms.
- **Omnivores:** organisms that consume both plants and meat.
- **Orbiting:** an object travels around another object in a circular or an elliptical path.
- **Organ system:** a system, such as circulatory, digestive, or respiratory, that consists of a collection of organs to perform a specific function.
- **Organ:** a differentiated part of an organism, such as an eye, heart, or leaf that performs a specific function.
- **Organism:** a living thing.
- **Photosynthesis:** a process by which green plants and other organisms produce simple sugars and oxygen from carbon dioxide and water, using energy that chlorophyll or other pigments absorb from the Sun.
- **Photovoltaic cell:** a semiconductor that transforms light energy directly to electrical energy.

- **Physical change:** a change of matter from one form to another without a change in chemical properties.
- **Physical property:** a characteristic of matter that does not involve a chemical change, such as density, color, or hardness.
- **Population:** organisms of the same species in a specified habitat.
- **Precipitation:** any form of water that falls to earth from a cloud.
- **Producer:** an organism that provides (makes) its own food (e.g., plants).
- **Quarter moon:** half of the Moon's face as observed from Earth is reflecting light.
- **Reproduce:** to produce offspring or new individuals through a sexual or an asexual process.
- **Revolve:** going around an object in a circular or an elliptical path.
- **Rotate:** spinning around an axis.
- **Runoff:** water that flows over the land surface outside of a channel.
- **Satellite (natural and artificial):** a smaller object that orbits a larger, more massive object.
- **Scale:** an instrument used to measure the weight or force of an object (e.g., a spring scale).
- **Seasons:** a period of time characterized by weather and other natural events caused by the tilt of Earth's axis as it is orbiting the Sun.
- **Sediment:** pieces of rocks.
- **Sedimentary rock:** a rock that forms through cementation of sediments or through processes such as evaporation and compaction.
- **Sexual reproduction:** reproduction that involves the union of male and female reproductive cells, each contributing half of the genetic makeup of the resulting offspring.
- **Simple machine:** a simple device, such as a lever, pulley, inclined plane, or a wheel and axle.
- **Skeletal system:** a collection of organs (e.g., bones, hard outer shells for insects) that provide structural support for an organism.
- **Solar eclipse:** the Sun appears dark when sunlight is blocked by the Moon.
- **Solution:** a homogenous mixture in which one substance dissolves into another.
- **Speed:** distance traveled per unit time.
- **Survival:** to manage to stay alive or continue to exist, especially in difficult situations.
- **Waning:** the light-reflecting part of the Moon is shrinking.
- **Water cycle:** a model describing the movement of water in, on, and above the earth.
- **Waxing:** the light-reflecting part of the Moon is getting larger.
- **Weathering:** a slow and continuous process of breaking down rocks chemically or mechanically.
- **Weight:** measure of the force of gravity on an object or the amount of matter (mass) as weighed on Earth.
- **Work:** the transfer of energy to a body by the application of a force that moves the body in the direction of the force ( $W = F \times d$ ).

## Glossary and Hierarchy of Terms Developed by the Science AGLE Review Committee

Terms	Definitions
<b>Explore</b>	Use of one or more of the five senses*, to participate within a science content activity.
<b>Engage</b>	Meaningful participation in a scientific activity.
<b>Identify</b>	Measurable recognition of a science concept (this may be shown in many modes, such as matching, labeling, naming, signing, pointing, and/or touching.)
<b>Investigate</b>	Conduct a science inquiry for purpose of gaining information.
<b>Describe</b>	Communicate/convey information about a science concept.
<b>Compare/Contrast</b>	Identify similarities and differences about a science concept.
<b>Predict</b>	Use of prior knowledge to determine what will or could happen within the content of a science activity.

**\*Five Senses** Use of smell, hearing, sight taste and/or touch (includes sensory feeling, such as how your body feels when a car slows down).

## Science Web Resources

The following websites have been recommended by educators and content consultants as resources to aid teachers in developing task/activity ideas.

[www.internet4classrooms.com](http://www.internet4classrooms.com)

[www.edheads.org](http://www.edheads.org)

[www.cln.org/themes/force\\_motion.html](http://www.cln.org/themes/force_motion.html)

[www.bbc.co.uk/schools/scienceclips/ages/10\\_11/forces\\_action.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/10_11/forces_action.shtml)

[http://edhelper.com/Forces\\_and\\_Motion.htm](http://edhelper.com/Forces_and_Motion.htm)

[www.bcps.org/offices/lis/curric/elem/Escience/html](http://www.bcps.org/offices/lis/curric/elem/Escience/html)

<http://marcopolo.mci.com/home.aspx>

[www.hoagiesgifted.org/eric/faq/sciencex.html](http://www.hoagiesgifted.org/eric/faq/sciencex.html)

# Science APIs

## Elementary – Grade 5

Title of Strand	Grade Focus
Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) <b>(ES)</b>	Required for Grade 5
Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It <b>(UN)</b>	Required for Grade 5
Strand 3: Characteristics and Interactions of Living Organisms <b>(LO)</b> <b>or</b> Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments <b>(EC)</b>	Select One API from Either Strand
Strand 7: Scientific Inquiry <b>(IN)</b> <b>or</b> Strand 8: Impacts of Science, Technology, and Human Activity <b>(ST)</b>	Select One API from either Strand

### Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) **(ES)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1.</b> The Earth's systems (geosphere, atmosphere, and hydrosphere) have both common components and unique structures.	<b>A</b> Earth's crust is composed of various materials, including soil, minerals, and rocks with characteristic properties	ES 1.1 Explore one or more physical properties of soil (e.g., odor, color, and/or appearance).  ES 1.2 <b>Explore one or more soil components (e.g., plant roots, leaves, grass, worms, and/or rocks).</b>  ES 1.4 Explore one or more physical properties of rocks (e.g., size, shape, and/or color).

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> The Earth's systems (geosphere, atmosphere, and hydrosphere) have both common components and unique structures.</p>	<p><b>B</b> The hydrosphere is composed of water (a material with unique properties) and other minerals.</p>	<p><b>ES 2.1</b> Explore one or more major bodies of surface water (e.g., rivers, lakes, oceans, and/or glaciers).</p>
	<p><b>C</b> The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles.</p>	<p><b>ES 3.1</b> Explore wind as moving air (e.g., a fan and/or a pinwheel).</p> <p><b>ES 3.2</b> Engage in an activity that demonstrates wind is moving air.</p> <p><b>ES 3.4</b> Explore water changing into a gas (e.g., observe a water puddle's size at different times and/or observe a humidifier).</p> <p><b>ES 3.9</b> Explore air as an invisible substance taking up space (e.g., observe a balloon growing as more air is added).</p>
<p><b>2.</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p><b>A</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p><b>ES 5.1</b> Explore the breakdown of plant material into soil through decomposition processes (e.g., decay, rotting, and composting).</p> <p><b>ES 5.2</b> Explore one or more of the major landforms on Earth (e.g., mountains, plains, peninsulas,</p> <p><b>ES 5.4</b> Explore how the Earth's surface can change abruptly (e.g., flooding, rock/mudslides, volcano eruptions, earthquakes, and/or storms).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p><b>F</b> Constantly changing properties of the atmosphere occur in patterns which are described as weather.</p>	<p>ES 7.1. Explore daily weather (e.g., precipitation, wind, cloud cover, and/or temperature).</p> <p><b>ES 7.3 Engage in an activity comparing temperatures in different locations (e.g., inside, outside, in the sun, or in the shade).</b></p>
<p><b>3.</b> Human activity is dependent upon and affects the Earth's resources and systems.</p>	<p><b>A</b> Human activity is dependent upon and affects Earth's resources and systems.</p>	<p>ES 8.1 Explore one or more ways humans use Earth's materials (e.g., soil and/or rock) in daily life.</p> <p><b>ES 8.2 Explore one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, and/or planting vegetation to reduce soil erosion).</b></p> <p><b>ES 8.3 Engage in an activity involving one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, and/or planting vegetation to reduce soil erosion).</b></p> <p>ES 8.4 Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., drinking, cooking, making ice cubes, bathing, swimming, and/or building snowmen).</p> <p><b>ES 8.6 Identify water as an important natural resource for human activity (e.g., food, recreation, habitat, irrigation, cleaning, and/or transportation).</b></p>

**Strand 6: Composition and Structure of the Universe and  
the Motion of the Objects within It (UN)**

<b>Big Idea</b>	<b>Concept</b>	<b>Alternate Performance Indicators (APIs)</b>
<p align="center"><b>1.</b> The universe has observable properties and structure.</p>	<p align="center"><b>A</b> The Earth, Sun, and Moon are part of a larger system that includes other planets and smaller celestial bodies.</p>	<p>UN 1.1 Explore one or more objects in the sky (e.g., the Sun, Moon, and/or stars).</p> <p><b>UN 1.2 Identify one or more objects in the sky (e.g., the Sun, Moon, and/or stars).</b></p> <p><b>UN 1.3 Explore one or more objects within the solar system (e.g., the Sun, planets, moons, asteroids, comets, and/or meteors).</b></p>
<p align="center"><b>2.</b> Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.</p>	<p align="center"><b>A</b> The apparent position of the Sun and other stars, as seen from Earth, changes in observable patterns.</p>	<p>UN 2.1 Distinguish the Sun from other objects in the sky.</p> <p>UN 2.2 Identify that the Sun can be seen only during the daytime.</p> <p><b>UN 2.4 Explore the pattern of daylight hours throughout the year (e.g., days are shorter during winter months and days are longer during summer months).</b></p>
	<p align="center"><b>B</b> The apparent position of the Moon, as seen from Earth, and its actual position relative to Earth change in observable patterns.</p>	<p><b>UN 3.1 Explore the Moon’s phases.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.</p>	<p><b>C</b> The regular and predictable motions of Earth and the Moon, relative to the Sun, explain natural phenomena on Earth, such as days, months, years, shadows, Moon phases, eclipses, tides and seasons.</p>	<p>UN 4.1 Explore the characteristics of the seasons in your region (e.g., warm, long days; leaves falling; cold short days; and/or flowers blooming).</p> <p><b>UN 4.2 Identify the characteristics of the seasons in your region (e.g., warm, long days; leaves falling; cold short days; and/or flowers blooming).</b></p> <p>UN 4.3 Explore the day/night cycle.</p> <p><b>UN 4.4 Identify the day/night cycle.</b></p> <p>UN 4.5 Explore the changes in length and/or position (direction) of shadows during the day.</p> <p><b>UN 4.6 Engage in an activity that demonstrates the relationship between the Sun’s position in the sky and the changes in length and position of shadows.</b></p>

### Strand 3: Characteristics and Interactions of Living Organisms (LO)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.</p>	<p><b>A</b> Organisms have basic needs for survival.</p>	<p>LO 1.1 Explore non-living things (e.g., rocks, soil, and water).</p> <p>LO 1.2 Explore living things (e.g., animals, plants, and people).</p> <p><b>LO 1.3 Identify living and non-living things (e.g., identify living things among a group of living and non-living things; sort things into living and non-living groups).</b></p> <p><b>LO 1.4 Identify one or more basic needs for animals (e.g., air, water, food, and/or shelter).</b></p> <p><b>LO 1.5 Identify one or more basic needs for plants (e.g., air, water, and/or light).</b></p>
	<p><b>B</b> Organisms progress through life cycles unique to different types of organisms.</p>	<p>LO 2.1 Explore one or more aspects of the life cycle of an animal (e.g., birth, growth, reproduction, and/or death).</p> <p>LO 2.2 Engage in a plant life cycle activity (e.g., watching a seedling grow into a mature plant).</p> <p><b>LO 2.4 Identify life stages of common organisms (e.g., seedling and tree; duckling and duck; and human baby and human adult).</b></p>
	<p><b>D</b> Plants and animals have different structures that serve similar functions necessary for the survival of the organism.</p>	<p>LO 3.3 Explore common plants (e.g., grass, flowers, and/or trees).</p> <p><b>LO 3.4 Identify one or more physical structures of common plants (e.g., stems, leaves, flowers, seeds, roots, and/or fruits).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.</p>	<p><b>E</b> Biological classifications are based on how organisms are related.</p>	<p><b>LO 4.2</b> Compare how plants and animals take in water.</p> <p><b>LO 4.3</b> Compare how plants and animals use oxygen.</p>
<p><b>2</b> Living organisms carry out life processes in order to survive.</p>	<p><b>B</b> Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth.</p>	<p><b>LO 5.1</b> Engage in an activity pertaining to a plant's need for sunlight and water to grow.</p> <p><b>LO 5.2</b> Investigate a plant's need for sunlight and water to grow.</p>
	<p><b>C</b> Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means.</p>	<p><b>LO 6.1</b> Engage in an activity that demonstrates water's path as it moves through a plant (e.g., dip a white carnation or celery stalk into different colors of food coloring and observe the plant's color change).</p> <p><b>LO 6.2</b> Explore the human body's major organs.</p>
<p><b>3</b> There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.</p>	<p><b>D</b> There is heritable variation within every organism species.</p>	<p><b>LO 8.1</b> Identify that living things have offspring (e.g., pairing a puppy to a dog).</p> <p><b>LO 8.2</b> Explore similarities and differences between animal parents and their offspring (e.g., eye color, hair/fur color, height, and/or markings).</p> <p><b>LO 8.4</b> Explore similarities and differences between mature plants and their seedlings.</p>

**Strand 4: Changes in Ecosystems and Interactions of Organisms  
with Their Environments (EC)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p align="center"><b>1.</b></p> <p>Organisms are interdependent with one another and with their environment.</p>	<p align="center"><b>A</b></p> <p>All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem.</p>	<p>EC 1.1 Explore one or more ways in which seasons affect plants or animals (e.g., animals gather/store food in the fall, animals hibernate in the winter, plants bud in the spring, and/or plants bear fruit in the summer).</p> <p><b>EC 1.2 Identify one or more ways in which seasons affect plant and animal behavior.</b></p> <p>EC 1.4 Explore one or more ways weather affects the everyday life of humans (e.g., clothing, transportation, and/or outdoor activities).</p> <p><b>EC 1.5 Identify one or more ways weather affects the everyday life of humans (e.g., clothing, transportation, and/or outdoor activities).</b></p> <p>EC 1.7 Explore one or more ways humans depend on plants and animals (e.g., food, clothing, and/or shelter).</p> <p><b>EC 1.8 Identify one or more ways humans depend on plants and animals (e.g., food, clothing, and/or shelter).</b></p>
	<p align="center"><b>C</b></p> <p>All organisms, including humans, and their activities cause changes in their environment that affect the ecosystem.</p>	<p><b>EC 2.3 Engage in one or more human activities that are beneficial to ecosystems (e.g., planting gardens and trees, restoring natural habitats, recycling, and/or carpooling).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Organisms are interdependent with one another and with their environment.</p>	<p><b>D</b> The diversity of species within an ecosystem is affected by changes in the environment which can be caused by other organisms or outside processes.</p>	<p><b>EC 3.1</b> Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., planting trees, picking up trash, and/or recycling).</p> <p><b>EC 3.2</b> Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, and/or habitat destruction).</p>
<p><b>2.</b> Matter and energy flow through an ecosystem.</p>	<p><b>A</b> As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it into a form they can use.</p>	<p><b>EC 4.1</b> Identify sunlight as the primary source of energy plants use to produce their own food.</p> <p><b>EC 4.2</b> Explore producers (e.g., plants), consumers (e.g., herbivores, carnivores, and omnivores) or decomposers (e.g., bacteria and some animals).</p> <p><b>EC 4.6</b> Identify predators and prey (e.g., fox and rabbit; hawk and chicken; and wolf and deer).</p>
<p><b>3.</b> Genetic variation sorted by the natural selection process explains evidence of biological evolution.</p>	<p><b>A</b> Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics or organisms and in the fossil record.</p>	<p><b>EC 5.1</b> Explore one or more adaptations that help plants survive in their environment (e.g., roots, winged seed, waxy leaves, and/or the fact that flowers and plants grow toward the direction of sunlight).</p> <p><b>EC 5.3</b> Explore one or more adaptations that help animals survive in their environments (e.g., thick fur, camouflage, hibernation, seasonal migration, and/or remaining motionless).</p>

## Strand 7: Scientific Inquiry (IN)

Big Idea	Concept	Alternate Performance Indicators (APIs)	
<p style="text-align: center;"><b>1.</b></p> <p>Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p style="text-align: center;"><b>A</b></p> <p>Scientific inquiry includes student ability to formulate a testable question and explanation and to select appropriate investigative methods in order to obtain evidence relevant to the explanation.</p>	IN 1.1	Indicate interest in objects, materials, and/or the environment via touching, looking, and/or pointing.
	IN 1.2	Explore one or more science-related topics.	
IN 1.3	<p><b>Identify an appropriate, science-related question (i.e., teacher generates a list of science-related questions and a student chooses one).</b></p>		
IN 1.7	Explore a simple investigation to answer a question (e.g., “Upon which ramp the marble go will faster?” or “Which material is magnetic?”).		
IN 1.8	<p><b>Engage in a simple investigation by following one or more simple steps to answer a question.</b></p>		
	<p style="text-align: center;"><b>B</b></p> <p>Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.</p>	IN 2.1	Explore objects in order to make qualitative observations (e.g., the ball is big; ice is cold; and/or the bus is yellow).
	IN 2.2	Explore simple tools and equipment (e.g., magnifiers/hand lenses, magnets, and/or equal arm balances).	
	IN 2.3	<p><b>Engage in scientific observations using simple tools, equipment, and/or techniques (e.g., magnifiers/hand lenses, magnets, and/or equal arm balances).</b></p>	
	IN 2.6	Engage in an activity to measure with non-standard units (e.g., lining paperclips end to end, and/or using hands or feet as units of measure).	
	IN 2.7	<p><b>Measure with non-standard units (e.g., lining paperclips end to end; using hands or feet as units of measure; and/or using marbles as weight units with an equal arm balance and varying size containers).</b></p>	

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p><b>C</b> Evidence is used to formulate explanations.</p>	<p><b>IN 3.1</b> Explore observations as support for reasonable explanation (e.g., Teacher states, “We have three students absent today. How do we know how many students are absent?”).</p> <p><b>IN 3.2</b> <b>Identify observations as support for reasonable explanation (e.g., Teacher prompts “Why is it warmer today?” and the student chooses from a list of responses.)</b></p>
	<p><b>D</b> Scientific inquiry includes evaluation of explanations (hypothesis, laws, and theories) in light of scientific principles (understandings).</p>	<p><b>IN 4.1</b> <b>Identify explanations using prior knowledge (e.g., Using personal experiences, the teacher says “recess is cancelled,” and the student chooses the reason “Because it’s raining.”).</b></p>
	<p><b>E</b> The nature of science relies upon communication of results and justification of explanations.</p>	<p><b>IN 5.1</b> Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., describing the weather as sunny, cloudy, rainy, and windy; or drawing a landscape as a mountain, river, trees, rocks, and/or soil).</p> <p><b>IN 5.2</b> <b>Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., separating the nuts from the trail mix due to food allergies).</b></p>

## Strand 8: Impacts of Science, Technology, and Human Activity (ST)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.</p>	<p><b>A</b> Designed objects are used to do things better or more easily and to do some things that, otherwise, could not be done at all.</p>	<p>ST 1.1 Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, and/or water).</p> <p>ST 1.2 Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, and/or telephones).</p> <p><b>ST1.3 Engage in an activity with objects that occur in nature and are made by man (e.g., putting bird seed in a manmade bird feeder).</b></p>
<p><b>3.</b> Science and technology affect, and are affected by, society.</p>	<p><b>A</b> People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done.</p>	<p>ST 3.1 Engage in an activity that uses scientific discoveries and technological advances which enhance the quality of human life (e.g., wheelchairs, switches, and/or assistive technologies).</p>
	<p><b>B</b> Social, political, economic, ethical, and environmental factors strongly influence, and are influenced by, the direction and progress of science and technology.</p>	<p>ST 4.1 Explore science and technology as it pertains to improving the environment (e.g., can crushers and/or refillable dispensers).</p>

# Science APIs

## Middle School – Grade 8

Title of Strand	Grade Focus
Strand 1: Properties and Principles of Matter and Energy <b>(ME)</b>	Required for Grade 8
Strand 2: Properties and Principles of Force and Motion <b>(FM)</b>	Required for Grade 8
Strand 5: Processes and Interactions of the Earth’s Systems (Geosphere, Atmosphere, and Hydrosphere) <b>(ES)</b>  <b>or</b> Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It <b>(UN)</b>	Select One API from Either Strand
Strand 7: Scientific Inquiry <b>(IN)</b>  <b>or</b> Strand 8: Impacts of Science, Technology, and Human Activity <b>(ST)</b>	Select One API from Either Strand

### Strand 1: Properties and Principles of Matter and Energy (ME)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1.</b> Changes in properties and states of matter provide evidence of the atomic theory of matter.	<b>A</b> Objects, and the materials they are made of, have properties that can be used to describe and classify them.	ME 1.1 Explore physical properties of objects using one or more of the five senses.
		ME 1.2 Identify common materials using one or more of the five senses.
		<b>ME 1.3 Sort objects into small groups using one or more physical properties.</b>
		<b>ME 1.4 Use simple tools to compare the size (the amount of space an object occupies) of objects.</b>
		ME 1.5 Use simple tools to measure the weight of objects.

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Changes in properties and states of matter provide evidence of the atomic theory of matter.</p>	<p><b>A</b> Objects, and the materials they are made of, have properties that can be used to describe and classify them.</p>	<p><b>ME 1.6 Measure the volume of liquids and/or solids.</b></p> <p><b>ME 1.7 Measure temperature.</b></p> <p>ME 1.8 Engage in an experiment with objects that float and sink in water.</p> <p>ME 1.9 Investigate that objects float or sink in water.</p>
	<p><b>B</b> Properties of mixtures depend upon the concentrations, properties, and interactions of particles.</p>	<p>ME 2.1 Explore how mixtures are made by combining solids.</p> <p>ME 2.2 Engage in an activity which creates a mixture (i.e., combine materials to form a new material with new properties, such as flour and water combined make dough).</p> <p>ME 2.3 Identify the components in a mixture.</p> <p>ME 2.5 Explore different solutions (e.g., Kool-Aid, lemonade, and/or chocolate milk).</p> <p><b>ME 2.6 Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</b></p> <p>ME 2.7 Investigate the properties of each component in a mixture/solution (e.g., oil and vinegar <i>do not</i> form solutions; salt and water <i>do</i> form solutions).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Changes in properties and states of matter provide evidence of the atomic theory of matter.</p>	<p><b>D</b> Physical changes in the state of matter that result from thermal changes can be explained by the kinetic theory of matter.</p>	<p>ME 3.1 Explore the states of matter (solid, liquid, and gas).</p> <p>ME 3.2 Identify states of matter (solid, liquid, and gas) based on observations.</p> <p><b>ME 3.3 Compare different states of matter.</b></p> <p>ME 3.5 Engage in an activity in which matter changes from one state to another (e.g., solid to liquid when ice melts or liquid to gas when heat raises the temperature of water).</p> <p><b>ME 3.6 Identify that matter changes from one state to another.</b></p> <p>ME 3.7 Identify everyday examples of matter changing state within the water cycle.</p>
<p><b>2.</b> Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.</p>	<p><b>A</b> Forms of energy have a source, a means of transfer (work and heat), and a receiver.</p>	<p>ME 4.1 Explore sound energy.</p> <p>ME 4.2 Explore sounds in everyday life.</p> <p>ME 4.3 Explore sound as vibrations.</p> <p>ME 4.4 Engage in an activity involving vibrations and sources of sound in everyday life (e.g., sprinkling rice on a plate and placing it atop a speaker playing music; using a tuning fork in a glass of water).</p> <p>ME 4.6 Explore differences in sound volume, pitch, and rhythm.</p> <p><b>ME 4.7 Identify differences in sound volume, pitch, and rhythm.</b></p> <p>ME 4.11 Explore the ear as a sound receiver.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.</p>	<p><b>A</b> Forms of energy have a source, a means of transfer (work and heat), and a receiver.</p>	<p>ME 4.12 Compare the temperature of objects (i.e. cooler, warmer) by touch.</p> <p><b>ME 4.13 Compare the temperature of objects using a simple thermometer.</b></p> <p>ME 4.14 Identify sources of heat energy.</p> <p><b>ME 4.15 Identify materials as heat conductors (e.g., metals).</b></p> <p><b>ME 4.16 Identify materials as heat insulators.</b></p> <p><b>ME 4.17 Investigate the source of energy that causes an increase in an object's temperature.</b></p> <p><b>ME 4.19 Engage in activities that involve static electricity (e.g., using dryer sheets to prevent static electricity; rubbing feet on carpet).</b></p> <p><b>ME 4.25 Investigate light reflection and the visible light of various surfaces.</b></p>
	<p><b>C</b> Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth.</p>	<p>ME 5.1 Identify light from the Sun as a basic need of most plants.</p> <p><b>ME 5.2 Identify the Sun as the primary source of light and food energy on Earth.</b></p>

## Strand 2: Properties and Principles of Force and Motion (FM)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>1.</b></p> <p>The motion of an object is described by its change in position relative to another object or point.</p>	<p style="text-align: center;"><b>A</b></p> <p>The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference).</p>	<p>FM 1.1 Engage in an activity involving the position of an object relative to another object.</p> <p>FM 1.2 Identify the position of an object relative to another object (e.g., next to, in front of, behind, above, below, to the left, or to the right).</p> <p>FM 1.3 Compare the distance between two objects (e.g., Suzie is closer to the door).</p> <p>FM 1.4 Explore an object’s motion.</p> <p>FM 1.5 Identify when an object is moving (in motion) and/or not moving (at rest).</p> <p>FM 1.6 Engage in an activity involving starting and stopping a moving object (e.g., rolling a ball).</p> <p><b>FM 1.7 Investigate an object moving in different directions (e.g., forward, backward, sideways, up, down, in a circular motion).</b></p> <p><b>FM 1.8 Investigate ways to change the motion of an object (e.g., change an incline’s slope to make an object go slower, faster, farther).</b></p> <p><b>FM 1.10 Identify the initial and final positions of an object’s motion (e.g., the start and finish lines of a race track).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Forces affect motion.</p>	<p><b>A</b> Forces are classified as either contact (pushes, pulls, friction, and/or buoyancy) or noncontact forces (gravity, magnetism) that can be described in terms of direction and magnitude.</p>	<p>FM 3.1 Explore ways to cause an object to move (e.g., push and/or pull).</p> <p>FM 3.2 Identify ways to cause an object to move by applying force (e.g., push and/or pull).</p> <p><b>FM 3.3 Explore how different amounts of force and/or direction of force will act on the same object (e.g., the harder the push, the faster the object will move; the harder the push, the farther the object will travel).</b></p> <p>FM 3.5 Engage in an activity demonstrating that two magnets can push or pull each other and other objects without touching.</p> <p>FM 3.6 Explore magnetic force in reaction to different surfaces (e.g. metal, wood, cork, Styrofoam, plastic).</p> <p>FM 3.7 Identify surfaces that have magnetic attraction (e.g. refrigerator, filing cabinet, whiteboard).</p> <p>FM 3.8 Explore friction (e.g., rubbing one’s hands together or rolling a ball over different surfaces such as carpet, tile, wax paper, and/or grass).</p> <p>FM 3.9 Engage in an activity involving friction (e.g., rubbing one’s hands together or rolling a ball over different surfaces such as carpet, tile, wax paper, and/or grass).</p> <p><b>FM 3.10 Investigate friction as a force that slows down an object by comparing an object’s motion over different surfaces (e.g., rolling a ball across different surfaces such as carpet, tile, grass, and/or wax paper).</b></p> <p>FM 3.12 Explore how gravity affects objects (e.g., show gravity is a force that pulls objects to the ground by demonstrating how a ball falls when dropped).</p> <p>FM 3.13 Engage in an activity that compares the weight of two items of the same size (e.g., bag of chips and bag of flour; full glass or empty glass).</p> <p><b>FM 3.14 Measure the weight of different objects using a scale (e.g., measuring/weighing produce).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>2.</b> Forces affect motion.</p>	<p style="text-align: center;"><b>D</b> Newton's Laws of Motion explain the interaction of weight and forces, and these laws are used to predict changes in motion.</p>	<p>FM 4.1 Identify distances traveled by objects of varying weights when different amounts of force are applied.</p>
	<p style="text-align: center;"><b>F</b> Simple machines (levers, inclined planes, wheels and axels, and pulleys) affect the force applied to an object and/or direction of an object's movement as work is completed.</p>	<p>FM 5.1 Explore simple machines (e.g., inclined planes, levers, pulleys, wheels, and axles).</p> <p>FM 5.2 Engage in activities using simple machines.</p> <p><b>FM 5.3 Identify one or more of the following: inclined planes, levers, pulleys, wheels and/or axles.</b></p> <p><b>FM 5.4 Explore that simple machines can decrease the amount of effort and can change the direction of force (e.g., using a pulley takes less effort when lifting a heavy object versus lifting the object without a pulley; using a pulley requires one to pull down to lift an object instead of lifting it up).</b></p> <p><b>FM 5.5 Identify simple machines in common tools and household items (e.g., inclined plane and wheelchair ramp; wheel and axel, and shopping cart wheel; lever and wrench; pulley and flagpole).</b></p>

**Strand 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) (ES)**

<b>Big Idea</b>	<b>Concept</b>	<b>Alternate Performance Indicators (APIs)</b>
<p align="center"><b>1.</b> The Earth's systems (geosphere, atmosphere, and hydrosphere) have both common components and unique structures.</p>	<p align="center"><b>A</b> Earth's crust is composed of various materials, including soil, minerals, and rocks with characteristic properties.</p>	<p>ES 1.1 Explore one or more physical properties of soil (e.g., odor, color, and/or appearance).</p>
		<p>ES 1.2 Explore one or more soil components (e.g., plant roots, leaves, grass, worms, and/or rocks).</p>
		<p><b>ES 1.3 Compare the different types of soil (e.g., sand, pebbles, rock, and/or clay).</b></p>
		<p>ES 1.4 Explore one or more physical properties of rocks (e.g., size, shape, and/or color).</p>
		<p><b>ES 1.5 Identify one or more physical properties (i.e., size, shape, color, texture, layering, and/or fossil presence) of rocks (e.g., touch rocks; use a microscope to examine and describe rocks; draw pictures of rocks; weigh and compare rocks; do a rock hardness test; scratch rocks for color; and/or hammer on rocks to determine hardness).</b></p>
	<p align="center"><b>B</b> The hydrosphere is composed of water (a material with unique properties) and other minerals.</p>	<p>ES 2.1 Explore one or more major bodies of surface water (e.g., rivers, lakes, oceans, and/or glaciers).</p>
		<p><b>ES 2.2 Explore bodies of fresh and salt water.</b></p>
		<p><b>ES 2.3 Explore bodies of flowing and stationary water.</b></p>
		<p><b>ES 2.4 Explore bodies of solid and liquid water.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> The Earth's systems (geosphere, atmosphere, and hydrosphere) have both common components and unique structures.</p>	<p><b>C</b> The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles.</p>	<p>ES 3.1 Explore wind as moving air (e.g., a fan and/or a pinwheel).</p> <p>ES 3.2 Engage in an activity that demonstrates wind is moving air.</p> <p><b>ES 3.3 Describe the effects of wind as moving air (e.g. hairdryer; flag blowing in the wind; and/or wind chimes).</b></p> <p>ES 3.4 Explore water changing into a gas (e.g., observe a water puddle's size at different times and/or observe a humidifier).</p> <p><b>ES 3.6 Identify liquid water changing into a gas.</b></p> <p><b>ES 3.7 Engage in an activity that demonstrates clouds are made of tiny water droplets (e.g., cloud in a bottle).</b></p> <p><b>ES 3.8 Identify that clouds are made of tiny water droplets.</b></p> <p>ES 3.9 Explore air as an invisible substance taking up space (e.g., observe a balloon growing as more air is added).</p> <p><b>ES 3.10 Identify air as an invisible substance taking up space.</b></p>
	<p><b>D</b> Climate is a description of average weather conditions in a given area over time.</p>	<p><b>ES 4.1 Identify one or more aspects of weather and its impact on people to include precipitation (e.g., rain, snow, sleet, and/or hail); air temperature (e.g., Celsius/Fahrenheit, cold, warm, and/or hot); wind (e.g., flying a kite and/or a flag blowing on a pole); storms (e.g., thunderstorms, tornadoes, and/or hurricanes); and humidity (e.g., dry and/or humid).</b></p> <p><b>ES 4.2 Identify how climate affects people (e.g., hot and dry climates make growing plants difficult; and/or people need to wear warmer clothing and heat their homes in cold climates).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p><b>A</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p>ES 5.1 Explore the breakdown of plant material into soil through decomposition processes (e.g., decay, rotting, and composting).</p> <p>ES 5.2 Explore one or more of the major landforms on Earth (e.g., mountains, plains, peninsulas, coastlines, canyons, delta, and/or plateaus).</p> <p><b>ES 5.3 Identify one or more major landforms on Earth (e.g., mountains, plains, peninsulas, coastlines, canyons, delta, and/or plateaus).</b></p> <p>ES 5.4 Explore how the Earth's surface can change abruptly (e.g., flooding, rock/mudslides, volcano eruptions, earthquakes, and/or storms).</p> <p><b>ES 5.5 Identify how the Earth's surface can change abruptly (e.g., flooding, rock/mudslides, volcano eruptions, earthquakes, and/or storms).</b></p>
	<p><b>E</b> Changes in the form of water as it moves through the Earth's systems are described as the water cycle.</p>	<p><b>ES 6.1 Explore the components and sequence of the water cycle (e.g., evaporation as water vapor; condensation as dew and the formation of clouds; and precipitation as water falling in the form of rain, snow, sleet, and hail).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.</p>	<p><b>F</b> Constantly changing properties of the atmosphere occur in patterns which are described as weather.</p>	<p>ES 7.1. Explore daily weather (e.g., precipitation, wind, cloud cover, and/or temperature).</p> <p><b>ES 7.2 Engage in an activity to record weather data (e.g., precipitation by rain gauges, wind speed by wind socks, cloud cover by observations, and/or temperature by thermometers.)</b></p> <p>ES 7.3 Engage in an activity comparing temperatures in different locations (e.g., inside, outside, in the sun, or in the shade).</p> <p><b>ES 7.4 Compare temperatures in different locations (e.g., inside, outside, in the sun, and in the shade).</b></p> <p><b>ES 7.5 Identify elements in weather maps (e.g., temperatures, precipitation, wind speed, and fronts).</b></p>
<p><b>3.</b> Human activity is dependent upon and affects the Earth's resources and systems.</p>	<p><b>A</b> Human activity is dependent upon and affects Earth's resources and systems.</p>	<p>ES 8.1 Explore one or more ways humans use Earth's materials (e.g., soil and/or rock) in daily life.</p> <p>ES 8.2 Explore one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, and/or planting vegetation to reduce soil erosion).</p> <p>ES 8.3 Engage in an activity involving one or more ways to solve simple environmental problems (e.g., recycling to reduce trash, composting to create natural fertilizers, and/or planting vegetation to reduce soil erosion).</p> <p>ES 8.4 Explore ways water, as a solid and/or liquid, is used in everyday activities (e.g., drinking, cooking, making ice cubes, bathing, swimming, and/or building snowmen).</p> <p><b>ES 8.5 Engage in an activity using water, as a solid and/or liquid, is used in everyday activities (e.g., drinking, cooking, making ice cubes, bathing, swimming, and/or building snowmen).</b></p> <p>ES 8.6 Identify water as an important natural resource for human activity (e.g., food, recreation, habitat, irrigation, cleaning, and/or transportation).</p> <p><b>ES 8.7 Explore how human needs and activities impact water quality (e.g., irrigation, damming of rivers, waste treatment, drinking water sources, landfills, fertilizer and pesticide use, farms, and/or sewage).</b></p>

**Strand 6: Composition and Structure of the Universe and the Motion of the Objects within It (UN)**

<b>Big Idea</b>	<b>Concept</b>	<b>Alternate Performance Indicators (APIs)</b>
<p align="center"><b>1.</b> The universe has observable properties and structure.</p>	<p align="center"><b>A</b> The Earth, Sun, and Moon are part of a larger system that includes other planets and smaller celestial bodies.</p>	<p>UN 1.1 Explore one or more objects in the sky (e.g., the Sun, Moon, and/or stars).</p>
		<p>UN 1.2 Identify one or more objects in the sky (e.g., the Sun, Moon, and/or stars).</p>
		<p>UN 1.3 Explore one or more objects within the solar system (e.g., the Sun, planets, moons, asteroids, comets, and/or meteors).</p>
		<p><b>UN 1.4. Identify one or more objects within the solar system (e.g., the Sun, planets, moons, asteroids, comets, and/or meteors).</b></p>
<p align="center"><b>2.</b> Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.</p>	<p align="center"><b>A</b> The apparent position of the Sun and other stars, as seen from Earth, changes in observable patterns.</p>	<p>UN 2.1 Distinguish the Sun from other objects in the sky.</p>
		<p>UN 2.2 Identify that the Sun can be seen only during the daytime.</p>
		<p>UN 2.4 Explore the pattern of daylight hours throughout the year (e.g., days are shorter during winter months and days are longer during summer months).</p>
	<p align="center"><b>B</b> The apparent position of the Moon, as seen from Earth, and its actual position relative to Earth change in observable patterns.</p>	<p>UN 3.1 Explore the Moon's phases.</p> <p><b>UN 3.2 Identify the Moon's phases.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.</p>	<p><b>C</b> The regular and predictable motions of Earth and the Moon, relative to the Sun, explain natural phenomena on Earth, such as days, months, years, shadows, Moon phases, eclipses, tides and seasons.</p>	<p>UN 4.1 Explore the characteristics of the seasons in your region (e.g., warm, long days; leaves falling; cold short days; and/or flowers blooming).</p> <p>UN 4.2 Identify the characteristics of the seasons in your region (e.g., warm, long days; leaves falling; cold short days; and/or flowers blooming).</p> <p>UN 4.3 Explore the day/night cycle.</p> <p>UN 4.4 Identify the day/night cycle.</p> <p>UN 4.5 Explore the changes in length and/or position (direction) of shadows during the day.</p> <p>UN 4.6 Engage in an activity that demonstrates the relationship between the Sun’s position in the sky and the changes in length and position of shadows.</p> <p><b>UN 4.9 Engage in an activity using a class calendar that displays the Moon’s phases.</b></p>

## Strand 7: Scientific Inquiry (IN)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>1.</b></p> <p>Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p style="text-align: center;"><b>A</b></p> <p>Scientific inquiry includes student ability to formulate a testable question and explanation and to select appropriate investigative methods in order to obtain evidence relevant to the explanation.</p>	<p>IN 1.1 Indicate interest in objects, materials, and/or the environment via touching, looking, and/or pointing.</p> <p>IN 1.2 Explore one or more science-related topics.</p> <p>IN 1.3 Identify an appropriate, science-related question (i.e., teacher generates a list of science-related questions and a student chooses one).</p> <p><b>IN 1.4 Student asks a science-related question (e.g., teacher prompts for a science-related question with “What questions do you have about the topic?”).</b></p> <p><b>IN 1.5 Student identifies a testable, science-related question from a given list (e.g., Testable: “Which ball is heavier?”; Non-Testable: “Which color ball is the best?”).</b></p> <p>IN 1.7 Explore a simple investigation to answer a question (e.g., “Upon which ramp the marble go will faster?” or “Which material is magnetic?”).</p> <p>IN 1.8 Engage in a simple investigation by following one or more simple steps to answer a question.</p> <p><b>IN 1.9 Conduct a simple investigation to answer a question.</b></p>
	<p style="text-align: center;"><b>B</b></p> <p>Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.</p>	<p>IN 2.1 Explore objects in order to make qualitative observations (e.g., the ball is big; ice is cold; and/or the bus is yellow).</p> <p>IN 2.2 Explore simple tools and equipment (e.g., magnifiers/hand lenses, magnets, and/or equal arm balances).</p> <p>IN 2.3 Engage in scientific observations using simple tools, equipment, and/or techniques (e.g., magnifiers/hand lenses, magnets, and/or equal arm balances).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p><b>B</b> Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.</p>	<p><b>IN 2.4</b> Identify the appropriate tools to collect data (e.g., ruler, scale, thermometer, and/or measuring cup).</p> <p><b>IN 2.5</b> Use the appropriate tools to collect data (e.g., using a thermometer to correctly identify the temperature).</p> <p><b>IN 2.6</b> Engage in an activity to measure with non-standard units (e.g., lining paperclips end to end, and/or using hands or feet as units of measure).</p> <p><b>IN 2.7</b> Measure with non-standard units (e.g., lining paperclips end to end; using hands or feet as units of measure; and/or using marbles as weight units with an equal arm balance and varying size containers).</p> <p><b>IN 2.8</b> Measure one or more of the following with the appropriate unit: length, weight, temperature, and/or volume.</p> <p><b>IN 2.9</b> Identify whether measurements and quantities are reasonable.</p>
	<p><b>C</b> Evidence is used to formulate explanations.</p>	<p><b>IN 3.1</b> Explore observations as support for reasonable explanation (e.g., Teacher states, “We have three students absent today. How do we know how many students are absent?”).</p> <p><b>IN 3.2</b> Identify observations as support for reasonable explanation (e.g., Teacher prompts “Why is it warmer today?” and the student chooses from a list of responses.).</p> <p><b>IN 3.3</b> Use data as support for reasonable explanation (e.g., Wearing a coat is necessary when it is cold outside.).</p> <p><b>IN 3.4</b> Use observations and data to describe relationships and/or patterns (e.g., The steeper the hill, the faster a car will roll down it.).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p><b>D</b> Scientific inquiry includes evaluation of explanations (hypothesis, laws, and theories) in light of scientific principles (understandings).</p>	<p><b>IN 4.1</b> Identify explanations using prior knowledge (e.g., Using personal experiences, the teacher says “recess is cancelled,” and the student chooses the reason “Because it’s raining.”).</p> <p><b>IN 4.2</b> <b>Make explanations using prior knowledge (e.g., Using personal experiences, the teacher says “It’s time to change classes,” and the student responds with a reason, “Because the bell rang.”).</b></p>
	<p><b>E</b> The nature of science relies upon communication of results and justification of explanations.</p>	<p><b>IN 5.1</b> Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., describing the weather as sunny, cloudy, rainy, and windy; or drawing a landscape as a mountain, river, trees, rocks, and/or soil).</p> <p><b>IN 5.2</b> Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., separating the nuts from the trail mix due to food allergies).</p> <p><b>IN 5.3</b> <b>Communicate the results of an investigation using words, symbols, pictures, objects, and/or actions (e.g., using data tables and/or graphs).</b></p>

**Strand 8: Impacts of Science, Technology, and Human Activity (ST)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p align="center"><b>1.</b></p> <p>The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.</p>	<p align="center"><b>A</b></p> <p>Designed objects are used to do things better or more easily and to do some things that, otherwise, could not be done at all.</p>	<p>ST 1.1 Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, and/or water).</p> <p>ST 1.2 Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, and/or telephones).</p> <p>ST1.3 Engage in an activity with objects that occur in nature and are made by man (e.g., putting bird seed in a manmade bird feeder).</p> <p><b>ST 1.4 Identify objects that occur in nature.</b></p> <p><b>ST 1.5 Identify objects that have been designed and/or made by people to solve human problems (e.g., wheels and books) and/or to enhance quality of life (e.g., wheelchairs and elevators).</b></p>
	<p align="center"><b>B</b></p> <p>Technological solutions to problems often have drawbacks as well as benefits.</p>	<p><b>ST 2.1 Identify positive and/or negative effects of communication technologies (e.g., Positive: mobile phones can be used during an emergency in remote areas; Negative: using a mobile phone while driving a car can be dangerous).</b></p> <p><b>ST 2.2 Identify positive and/or negative effects of transportation technologies (e.g., Positive: cars, trains, and airplanes can reduce travel and shipping time; Negative: types of transportation can increase noise and air pollution).</b></p> <p><b>ST 2.3 Identify the effects in the advances of weather observation and prediction (e.g., Doppler radar offers early warning of potential storms; satellite images contribute to the forecast to help farmers plant and harvest crops).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3.</b> Science and technology affect, and are affected by, society.</p>	<p><b>A</b> People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done.</p>	<p>ST 3.1 Engage in an activity that uses scientific discoveries and technological advances which enhance the quality of human life (e.g., wheelchairs, switches, and/or assistive technologies).</p> <p><b>ST 3.2 Identify scientific discoveries and technological advances which enhance the quality of human life (e.g., wheelchairs, switches, and/or assistive technologies).</b></p>
	<p><b>B</b> Social, political, economic, ethical, and environmental factors strongly influence, and are influenced by, the direction and progress of science and technology.</p>	<p>ST 4.1 Explore science and technology as it pertains to improving the environment (e.g., can crushers and/or refillable dispensers).</p> <p><b>ST 4.2 Identify the scientific technology used to overcome physical limitations (e.g., wheelchairs, restroom handrails, adaptive utensils, and/or touch screen computers).</b></p> <p><b>ST 4.3 Identify solutions to environmental problems using scientific technology (e.g., rechargeable batteries, recycling, and/or composting).</b></p>

# Science APIs

## High School – Grade11

Title of Strand	Grade Focus
Strand 3: Characteristics and Interactions of Living Organisms ( <b>LO</b> )	Required for Grade 11
Strand 4: Changes in Ecosystems and Interactions of Organisms with Their Environments ( <b>EC</b> )	Required for Grade 11
Strand 1: Properties and Principles of Matter and Energy ( <b>ME</b> ) <b>or</b> Strand 2: Properties and Principles of Force and Motion ( <b>FM</b> )	Select One API from Either Strand
Strand 7: Scientific Inquiry ( <b>IN</b> ) <b>or</b> Strand 8: Impacts of Science, Technology, and Human Activity ( <b>ST</b> )	Select One API from Either Strand

### Strand 3: Characteristics and Interactions of Living Organisms (LO)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.	<b>A</b> Organisms have basic needs for survival	LO 1.1 Explore non-living things (e.g., rocks, soil, and water).
		LO 1.2 Explore living things (e.g., animals, plants, and people).
		LO 1.3 Identify living and non-living things (e.g., identify living things among a group of living and non-living things; sort things into living and non-living groups).
		LO 1.4 Identify one or more basic needs for animals (e.g., air, water, food, and/or shelter).
		LO 1.5 Identify one or more basic needs for plants (e.g., air, water, and/or light).

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.</p>	<p><b>A</b> Organisms have basic needs for survival</p>	<p>LO 1.6 Investigate what happens when a plant's growing conditions are changed (e.g., dark versus light; water versus no water).</p> <p>LO 1.7 Identify the common life processes required for organism survival (e.g., growth, reproduction, life span, stimuli response, energy use, gas exchanges, water use, and/or waste elimination).</p> <p><b>LO 1.8. Investigate common life processes required for organism survival (e.g., growth, reproduction, life span, stimuli response, energy use, gas exchanges, water use, and/or waste elimination).</b></p> <p>LO 1.9 Identify that most plants and animals require food and oxygen to carry out life processes.</p>
	<p><b>B</b> Organisms progress through life cycles unique to different types of organisms</p>	<p>LO 2.1 Explore one or more aspects of the life cycle of an animal (e.g., birth, growth, reproduction, and/or death).</p> <p>LO 2.2 Engage in a plant life cycle activity (e.g., watching a seedling grow into a mature plant).</p> <p>LO 2.3 Identify the plant life cycle (e.g., seed germination, growth, reproduction, and/or death).</p> <p>LO 2.4 Identify life stages of common organisms (e.g., seedling and tree; duckling and duck; and human baby and human adult).</p> <p>LO 2.5 Match offspring with parent (e.g., puppy and dog; kitten and cat; chick and hen; and cub and bear).</p> <p>LO 2.6 Identify the correct sequence of stages in the life cycle of familiar animals (cat, dog, frogs, and/or butterflies).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.</p>	<p><b>B</b> Organisms progress through life cycles unique to different types of organisms</p>	<p>LO 2.7 Identify the similarities between parent and offspring.</p> <p>LO 2.8 Match offspring with parent (e.g., puppy and dog; kitten and cat; chick and hen; and cub and bear).</p> <p><b>LO 2.9 Compare physical characteristics that distinguish parent and offspring (e.g., feet, noses, tails, and/or wings).</b></p>
	<p><b>D</b> Plants and animals have different structures that serve similar functions necessary for the survival of the organism.</p>	<p>LO 3.1 Identify the functions of one or more of the following parts: sensory organs, appendages, or other major organs (e.g., hands pick things up, eyes see, and/or ears hear).</p> <p><b>LO 3.2 Compare physical structures that serve basic needs in different animals (e.g., the ability to move, such as wings versus legs or fins; the ability to protect and keep warm, such as a turtle shell versus human skin, duck feathers, or dog hair; and/or the ability to breathe, such as lungs versus gills).</b></p> <p>LO 3.3 Explore common plants (e.g., grass, flowers, and/or trees).</p> <p>LO 3.4 Identify one or more physical structures of common plants (e.g., stems, leaves, flowers, seeds, roots, and/or fruits).</p> <p>LO 3.5 Identify the function of one or more of the following plant structures: roots, stems, leaves, flowers, seeds and/or fruits (e.g., roots hold plants in place and bring nutrients and water from soil to the plant; stems provide plants support and let water and nutrients move throughout the plant; plants use leaves to make food; and/or flowers, seeds, and fruits are related to the reproduction of flowering plants).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> There is a fundamental unity underlying the diversity of all living organisms.</p>	<p><b>E</b> Biological classifications are based on how organisms are related.</p>	<p>LO 4.1 Identify how some plants and animals protect themselves (e.g., roses with thorns, cacti with needles, poison ivy, camouflage, claws, and/or teeth).</p> <p>LO 4.2 Compare how plants and animals take in water.</p> <p>LO 4.3 Compare how plants and animals use oxygen.</p> <p>LO 4.4 Compare how plants and animals support themselves (e.g., some plants use stems, trunks, and/or roots for support; some animals use an exoskeleton or endoskeleton for support).</p> <p>LO 4.5 Compare how plants and animals obtain energy (e.g., plants make their own food; animals acquire food).</p> <p><b>LO 4.6 Compare how plants and animals respond to changes in conditions.</b></p> <p><b>LO 4.7 Compare how plants and animals protect themselves.</b></p>
<p><b>2</b> Living organisms carry out life processes in order to survive.</p>	<p><b>B</b> Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth.</p>	<p>LO 5.1 Engage in an activity pertaining to a plant's need for sunlight and water to grow.</p> <p>LO 5.2 Investigate a plant's need for sunlight and water to grow.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2</b> Living organisms carry out life processes in order to survive.</p>	<p><b>C</b> Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means.</p>	<p>LO 6.1 Engage in an activity that demonstrates water's path as it moves through a plant (e.g., dip a white carnation or celery stalk into different colors of food coloring and observe the plant's color change).</p> <p>LO 6.2 Explore the human body's major organs.</p> <p>LO 6.3 Identify the human body's major organs.</p> <p>LO 6.4 Explore the functions of the human body's major organs.</p> <p><b>LO 6.5 Identify the human body's major organs and their functions.</b></p>
<p><b>3</b> There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.</p>	<p><b>A</b> Reproduction can occur both asexually and sexually.</p>	<p>LO 7.1 Identify reproduction as a process whereby new individuals (offspring) are produced by parent(s).</p> <p>LO 7.2 Identify that physical characteristics of parent(s) are passed to new offspring (e.g., hair color, skin color, eye color, height, petals, flowers, fruits, and/or seeds).</p>
	<p><b>D</b> There is heritable variation within every organism species.</p>	<p>LO 8.1 Identify that living things have offspring (e.g., pairing a puppy to a dog).</p> <p>LO 8.2 Explore similarities and differences between animal parents and their offspring (e.g., eye color, hair/fur color, height, and/or markings).</p> <p><b>LO 8.3 Identify similarities and differences between animal parents and their offspring (e.g., eye color, hair/fur color, height, and/or markings).</b></p> <p>LO 8.4 Explore similarities and differences between mature plants and their seedlings.</p> <p><b>LO 8.5 Identify similarities and differences between mature plants and their seedlings.</b></p>

**Strand 4: Changes in Ecosystems and Interactions of Organisms  
with Their Environments (EC)**

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Organisms are interdependent with one another and with their environment.</p>	<p><b>A</b> All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem</p>	<p>EC 1.1 Explore one or more ways in which seasons affect plants or animals (e.g., animals gather/store food in the fall, animals hibernate in the winter, plants bud in the spring, and/or plants bear fruit in the summer).</p> <p>EC 1.2 Identify one or more ways in which seasons affect plant and animal behavior.</p> <p>EC 1.3 Describe one or more ways in which seasons affect plant and animal behavior.</p> <p>EC 1.4 Explore one or more ways weather affects the everyday life of humans (e.g., clothing, transportation, and/or outdoor activities).</p> <p>EC 1.5 Identify one or more ways weather affects the everyday life of humans (e.g., clothing, transportation, and/or outdoor activities).</p> <p>EC 1.6 Describe one or more ways seasons or weather affect the everyday life of humans.</p> <p>EC 1.7 Explore one or more ways humans depend on plants and animals (e.g., food, clothing, and/or shelter).</p> <p>EC 1.8 Identify one or more ways humans depend on plants and animals (e.g., food, clothing, and/or shelter).</p> <p>EC 1.9 Describe one or more ways humans depend on plants and animals.</p> <p>EC 1.10 Explore one or more ways a specific organism may interact with other organisms and the environment (e.g., a bee’s interaction with a flower and the resulting pollination; brown deer blend into trees; and/or dandelion seeds spread by wind).</p> <p><b>EC 1.11 Identify how different environments support the life of different types of plants and animals.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Organisms are interdependent with one another and with their environment.</p>	<p><b>C</b> All organisms, including humans, and their activities cause changes in their environment that affect the ecosystem.</p>	<p>EC 2.1 Identify one or more human activities that are harmful to ecosystems (e.g., waste disposal, pollution, logging, mining, building roads, building dams, burning fossil fuels, waste disposal, and/or habitat destruction).</p> <p><b>EC 2.2 Describe one or more human activities that are harmful to ecosystems (e.g., waste disposal, pollution, logging, mining, building roads, building dams, burning fossil fuels, waste disposal, and/or habitat destruction).</b></p> <p>EC 2.3 Engage in one or more human activities that are beneficial to ecosystems (e.g., planting gardens and trees, restoring natural habitats, recycling, and/or carpooling).</p> <p>EC 2.4 Identify one or more human activities that are beneficial to ecosystems (e.g., reintroduction of species, planting gardens and trees, restoring natural habitats, recycling, alternate energy and/or carpooling).</p>
	<p><b>D</b> The diversity of species within an ecosystem is affected by changes in the environment which can be caused by other organisms or outside processes.</p>	<p>EC 3.1 Explore one or more examples in Missouri where human activity has a positive effect on other organisms (e.g., planting trees, picking up trash, and/or recycling).</p> <p>EC 3.2 Explore one or more examples in Missouri where human activity has a negative effect on other organisms (e.g., littering, construction, and/or habitat destruction).</p> <p><b>EC 3.3 Engage in a project wherein human activity has a positive effect on other organism(s) (e.g., a community service project).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Matter and energy flow through an ecosystem.</p>	<p><b>A</b> As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it into a form they can use.</p>	<p>EC 4.1 Identify sunlight as the primary source of energy plants use to produce their own food.</p> <p>EC 4.2 Explore producers (e.g., plants), consumers (e.g., herbivores, carnivores, and omnivores) or decomposers (e.g., bacteria and some animals).</p> <p>EC 4.3 Identify producers (e.g., plants), consumers (e.g., herbivores, carnivores, and omnivores) or decomposers (e.g., bacteria and some animals).</p> <p>EC 4.4 Explore the flow of energy through a food chain (e.g., sun &gt; plants &gt; rabbits &gt; hawks).</p> <p><b>EC 4.5 Identify one or more possible effects of removing an organism from a food chain.</b></p> <p>EC 4.6 Identify predators and prey (e.g., fox and rabbit; hawk and chicken; and wolf and deer).</p>
<p><b>3.</b> Genetic variation sorted by the natural selection process explains evidence of biological evolution.</p>	<p><b>A</b> Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics or organisms and in the fossil record.</p>	<p>EC 5.1 Explore one or more adaptations that help plants survive in their environment (e.g., roots, winged seed, waxy leaves, and/or the fact that flowers and plants grow toward the direction of sunlight).</p> <p><b>EC 5.2 Identify whether a common plant would be able to survive in a specific environment based on its structural or behavioral characteristics (e.g., “Would waxy leaf plants survive in a desert?” and/or “Would palm trees survive in the arctic?”).</b></p> <p>EC 5.3 Explore one or more adaptations that help animals survive in their environments (e.g., thick fur, camouflage, hibernation, seasonal migration, and/or remaining motionless).</p> <p><b>EC 5.4 Identify if a common animal would be able to survive in a specific environment based on its structural or behavioral characteristics (e.g., “Would frogs and snakes survive in the arctic?”).</b></p>

## Strand 1: Properties and Principles of Matter and Energy (ME)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Changes in properties and states of matter provide evidence of the atomic theory of matter.</p>	<p><b>A</b> Objects, and the materials they are made of, have properties that can be used to describe and classify them.</p>	<p>ME 1.1 Explore physical properties of objects using one or more of the five senses.</p> <p>ME 1.2 Identify common materials using one or more of the five senses.</p> <p>ME 1.3 Sort objects into small groups using one or more physical properties.</p> <p>ME 1.4 Use simple tools to compare the size (the amount of space an object occupies) of objects.</p> <p>ME 1.5 Use simple tools to measure the weight of objects.</p> <p>ME 1.6 Measure the volume of liquids and/or solids.</p> <p>ME 1.7 Measure temperature.</p> <p>ME 1.8 Engage in an experiment with objects that float and sink in water.</p> <p>ME 1.9 Investigate that objects float or sink in water.</p> <p><b>ME 1.10 Identify the concept that matter takes up space and may have weight.</b></p>
	<p><b>B</b> Properties of mixtures depend upon the concentrations, properties, and interactions of particles.</p>	<p>ME 2.1 Explore how mixtures are made by combining solids.</p> <p>ME 2.2 Engage in an activity which creates a mixture (i.e., combine materials to form a new material with new properties, such as flour and water combined make dough).</p> <p>ME 2.3 Identify the components in a mixture.</p> <p><b>ME 2.4 Identify ways to separate the components of a mixture by physical property (e.g., filtration and/or evaporation).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Changes in properties and states of matter provide evidence of the atomic theory of matter.</p>	<p><b>B</b> Properties of mixtures depend upon the concentrations, properties, and interactions of particles.</p>	<p>ME 2.5 Explore different solutions (e.g., Kool-Aid, lemonade, and/or chocolate milk).</p> <p>ME 2.6 Compare different solutions using their physical properties (e.g., color, smell, and/or taste).</p> <p>ME 2.7 Investigate the properties of each component in a mixture/solution (e.g., oil and vinegar <i>do not</i> form solutions; salt and water <i>do</i> form solutions).</p>
	<p><b>D</b> Physical changes in the state of matter that result from thermal changes can be explained by the kinetic theory of matter.</p>	<p>ME 3.1 Explore the states of matter (solid, liquid, and gas).</p> <p>ME 3.2 Identify states of matter (solid, liquid, and gas) based on observations.</p> <p>ME 3.3 Compare different states of matter.</p> <p><b>ME 3.4 Classify matter as a solid, liquid, or gas from everyday examples using physical properties.</b></p> <p>ME 3.5 Engage in an activity in which matter changes from one state to another (e.g., solid to liquid when ice melts or liquid to gas when heat raises the temperature of water).</p> <p>ME 3.6 Identify that matter changes from one state to another.</p> <p>ME 3.7 Identify everyday examples of matter changing state within the water cycle.</p> <p><b>ME 3.8 Compare changes in the physical properties of water (i.e., shape, volume) when frozen and/or melted.</b></p> <p><b>ME 3.9 Predict the effect of heat and temperature on objects and materials through observation.</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.</p>	<p><b>A</b> Forms of energy have a source, a means of transfer (work and heat), and a receiver.</p>	<p>ME 4.1 Explore sound energy.</p> <p>ME 4.2 Explore sounds in everyday life.</p> <p>ME 4.3 Explore sound as vibrations.</p> <p>ME 4.4 Engage in an activity involving vibrations and sources of sound in everyday life (e.g., sprinkling rice on a plate and placing it atop a speaker playing music; using a tuning fork in a glass of water).</p> <p><b>ME 4.5 Describe sounds and their source(s) of vibrations in everyday life.</b></p> <p>ME 4.6 Explore differences in sound volume, pitch, and rhythm.</p> <p>ME 4.7 Identify differences in sound volume, pitch, and rhythm.</p> <p><b>ME 4.8 Demonstrate ways to change sound volume.</b></p> <p><b>ME 4.9 Demonstrate ways to change sound pitch</b></p> <p><b>ME 4.10 Identify the concept that matter takes up space and may have weight.</b></p> <p>ME 4.11 Explore the ear as a sound receiver.</p> <p>ME 4.12 Compare the temperature of objects (i.e. cooler, warmer) by touch.</p> <p>ME 4.13 Compare the temperature of objects using a simple thermometer.</p> <p>ME 4.14 Identify sources of heat energy.</p> <p>ME 4.15 Identify materials as heat conductors (e.g., metals).</p> <p>ME 4.16 Identify materials as heat insulators.</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>2.</b> Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.</p>	<p><b>A</b> Forms of energy have a source, a means of transfer (work and heat), and a receiver.</p>	<p>ME 4.17 Investigate the source of energy that causes an increase in an object's temperature.</p> <p><b>ME 4.18 Classify materials as conductors or insulators of heat.</b></p> <p>ME 4.19 Engage in activities that involve static electricity (e.g., using dryer sheets to prevent static electricity; rubbing feet on carpet).</p> <p><b>ME 4.20 Investigate static electricity.</b></p> <p><b>ME 4.21 Identify materials as electrical conductors.</b></p> <p><b>ME 4.22 Identify materials as electrical insulators.</b></p> <p><b>ME 4.23 Investigate and identify sources of light energy.</b></p> <p><b>ME 4.24 Compare light intensity (i.e., brighter, dimmer).</b></p> <p>ME 4.25 Investigate light reflection and the visible light of various surfaces.</p>
	<p><b>C</b> Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth.</p>	<p>ME 5.1 Identify light from the Sun as a basic need of most plants.</p> <p>ME 5.2 Identify the Sun as the primary source of light and food energy on Earth.</p> <p><b>ME 5.3 Identify the Sun as the primary source of energy for temperature change on Earth.</b></p>

## Strand 2: Properties and Principles of Force and Motion (FM)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> The motion of an object is described by its change in position relative to another object or point.</p>	<p><b>A</b> The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)</p>	<p>FM 1.1 Engage in an activity involving the position of an object relative to another object.</p> <p>FM 1.2 Identify the position of an object relative to another object (e.g., next to, in front of, behind, above, below, to the left, or to the right).</p> <p>FM 1.3 Compare the distance between two objects (e.g., Suzie is closer to the door).</p> <p>FM 1.4 Explore an object’s motion.</p> <p>FM 1.5 Identify when an object is moving (in motion) and/or not moving (at rest).</p> <p>FM 1.6 Engage in an activity involving starting and stopping a moving object (e.g., rolling a ball).</p> <p>FM 1.7 Investigate an object moving in different directions (e.g., forward, backward, sideways, up, down, in a circular motion).</p> <p>FM 1.8 Investigate ways to change the motion of an object (e.g., change an incline’s slope to make an object go slower, faster, farther).</p> <p><b>FM 1.9. Describe an object’s motion (e.g. beating a drum, walking in a zigzag motion, turning a wheelchair).</b></p> <p>FM 1.10 Identify the initial and final positions of an object’s motion (e.g., the start and finish lines of a race track).</p> <p><b>FM 1.11 Identify the initial and final time of an object’s motion (e.g., using a stopwatch or timer).</b></p> <p><b>FM 1.12 Compare objects moving at different speeds (e.g., fast, slow, faster, slower).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> The motion of an object is described by its change in position relative to another object or point.</p>	<p><b>A</b> The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)</p>	<p><b>FM 2.1</b> Investigate one or more of the following: an object going faster (e.g., walking to jogging to running; being pushed on a swing; increasing a ramp’s incline as marbles roll down), slower (e.g., feeling force on one’s body as a car slows to a stop; reducing a ramp’s incline as marbles roll down), and changing directions (e.g., bouncing a ball, flying a kite).</p>
<p><b>2.</b> Forces affect motion.</p>	<p><b>A</b> Forces are classified as either contact (pushes, pulls, friction, and/or buoyancy) or noncontact forces (gravity, magnetism) that can be described in terms of direction and magnitude.</p>	<p>FM 3.1 Explore ways to cause an object to move (e.g., push and/or pull).</p> <p>FM 3.2 Identify ways to cause an object to move by applying force (e.g., push and/or pull).</p> <p>FM 3.3 Explore how different amounts of force and/or direction of force will act on the same object (e.g., the harder the push, the faster the object will move; the harder the push, the farther the object will travel).</p> <p><b>FM 3.4 Identify the distance an object traveled using its initial and final positions.</b></p> <p>FM 3.5 Engage in an activity demonstrating that two magnets can push or pull each other and other objects without touching.</p> <p>FM 3.6 Explore magnetic force in reaction to different surfaces (e.g. metal, wood, cork, Styrofoam, plastic).</p> <p>FM 3.7 Identify surfaces that have magnetic attraction (e.g. refrigerator, filing cabinet, whiteboard).</p> <p>FM 3.8 Explore friction (e.g., rubbing one’s hands together or rolling a ball over different surfaces such as carpet, tile, wax paper, and/or grass).</p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p data-bbox="191 247 376 352"><b>2.</b> Forces affect motion.</p>	<p data-bbox="409 247 626 814"><b>A</b> Forces are classified as either contact (pushes, pulls, friction, and/or buoyancy) or noncontact forces (gravity, magnetism) that can be described in terms of direction and magnitude.</p>	<p data-bbox="651 247 1430 394">FM 3.9 Engage in an activity involving friction (e.g., rubbing one’s hands together or rolling a ball over different surfaces such as carpet, tile, wax paper, and/or grass).</p> <p data-bbox="651 436 1430 625">FM 3.10 Investigate friction as a force that slows down an object by comparing an object’s motion over different surfaces (e.g., rolling a ball across different surfaces such as carpet, tile, grass, and/or wax paper).</p> <p data-bbox="651 667 1430 814"><b>FM 3.11 Identify that force is required to overcome friction in order to move an object (e.g., moving a wheelchair or a grocery cart across different surfaces).</b></p> <p data-bbox="651 856 1430 1003">FM 3.12 Explore how gravity affects objects (e.g., show gravity is a force that pulls objects to the ground by demonstrating how a ball falls when dropped).</p> <p data-bbox="651 1045 1430 1192">FM 3.13 Engage in an activity that compares the weight of two items of the same size (e.g., bag of chips and bag of flour; full glass or empty glass).</p> <p data-bbox="651 1234 1430 1308">FM 3.14 Measure the weight of different objects using a scale (e.g., measuring/weighing produce).</p> <p data-bbox="651 1350 1430 1539"><b>FM 3.15 Identify Earth’s gravity as an invisible force that pulls objects toward Earth surface (e.g., student drops a book and a ball, causing both objects to fall to Earth instead of floating).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)	
<p><b>2.</b> Forces affect motion.</p>	<p><b>D</b> Newton's Laws of Motion explain the interaction of weight and forces, and these laws are used to predict changes in motion.</p>	<p>FM 4.1</p>	<p>Identify distances traveled by objects of varying weights when different amounts of force are applied.</p>
	<p><b>FM 4.2</b></p>	<p><b>Investigate how the weight of an object affects the motion of that object (e.g., pushing an empty versus a full shopping cart; bowling with a light versus a heavy bowling ball).</b></p>	
	<p><b>F</b> Simple machines (levers, inclined planes, wheels and axels, and pulleys) affect the force applied to an object and/or direction of an object's movement as work is completed.</p>	<p>FM 5.1</p>	<p>Explore simple machines (e.g., inclined planes, levers, pulleys, wheels, and axles).</p>
		<p>FM 5.2</p>	<p>Engage in activities using simple machines.</p>
		<p>FM 5.3</p>	<p>Identify one or more of the following: inclined planes, levers, pulleys, wheels and/or axles.</p>
		<p>FM 5.4</p>	<p>Explore that simple machines can decrease the amount of effort and can change the direction of force (e.g., using a pulley takes less effort when lifting a heavy object versus lifting the object without a pulley; using a pulley requires one to pull down to lift an object instead of lifting it up).</p>
		<p>FM 5.5</p>	<p>Identify simple machines in common tools and household items (e.g., inclined plane and wheelchair ramp; wheel and axel, and shopping cart wheel; lever and wrench; pulley and flagpole).</p>
		<p><b>FM 5.6</b></p>	<p><b>Identify how simple machines are used in real life situations (e.g., using a wheelchair ramp; moving a heavy object with a dolly/ cart; using a wrench to fix something).</b></p>

## Strand 7: Scientific Inquiry (IN)

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p style="text-align: center;"><b>1.</b></p> <p>Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p style="text-align: center;"><b>A</b></p> <p>Scientific inquiry includes student ability to formulate a testable question and explanation and to select appropriate investigative methods in order to obtain evidence relevant to the explanation.</p>	<p>IN 1.1 Indicate interest in objects, materials, and/or the environment via touching, looking, and/or pointing.</p> <p>IN 1.2 Explore one or more science-related topics.</p> <p>IN 1.3 Identify an appropriate, science-related question (i.e., teacher generates a list of science-related questions and a student chooses one).</p> <p>IN 1.4 Student asks a science-related question (e.g., teacher prompts for a science-related question with “What questions do you have about the topic?”).</p> <p>IN 1.5 Student identifies a testable, science-related question from a given list (e.g., Testable: “Which ball is heavier?”; Non-Testable: “Which color ball is the best?”).</p> <p><b>IN 1.6 Student asks a testable, science-related question (e.g., “Which car rolls faster?”)</b></p> <p>IN 1.7 Explore a simple investigation to answer a question (e.g., “Upon which ramp the marble go will faster?” or “Which material is magnetic?”).</p> <p>IN 1.8 Engage in a simple investigation by following one or more simple steps to answer a question.</p> <p>IN 1.9 Conduct a simple investigation to answer a question.</p> <p><b>IN 1.10 Plan a simple investigation to answer a question.</b></p>



Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p><b>C</b> Evidence is used to formulate explanations.</p>	<p>IN 3.1 Explore observations as support for reasonable explanation (e.g., Teacher states, “We have three students absent today. How do we know how many students are absent?”).</p> <p>IN 3.2 Identify observations as support for reasonable explanation (e.g., Teacher prompts “Why is it warmer today?” and the student chooses from a list of responses.).</p> <p>IN 3.3 Use data as support for reasonable explanation (e.g., Wearing a coat is necessary when it is cold outside.).</p> <p>IN 3.4 Use observations and data to describe relationships and/or patterns (e.g., The steeper the hill, the faster a car will roll down it.).</p> <p><b>IN 3.5 Use observations and data to make predictions.</b></p>
	<p><b>D</b> Scientific inquiry includes evaluation of explanations (hypothesis, laws, and theories) in light of scientific principles (understandings).</p>	<p>IN 4.1 Identify explanations using prior knowledge (e.g., Using personal experiences, the teacher says “recess is cancelled,” and the student chooses the reason “Because it’s raining.”).</p> <p>IN 4.2 Make explanations using prior knowledge (e.g., Using personal experiences, the teacher says “It’s time to change classes,” and the student responds with a reason, “Because the bell rang.”).</p> <p><b>IN 4.3 Identify the reasonableness of an explanation (e.g., “Is it reasonable that it would snow when it is 100 degrees outside?”).</b></p>

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>1.</b> Scientific understanding is developed through the use of scientific process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.</p>	<p><b>E</b> The nature of science relies upon communication of results and justification of explanations.</p>	<p>IN 5.1    Communicate observations and/or events using words, symbols, pictures, objects, and/or actions (e.g., describing the weather as sunny, cloudy, rainy, and windy; or drawing a landscape as a mountain, river, trees, rocks, and/or soil).</p> <p>IN 5.2    Communicate simple procedures using words, symbols, pictures, objects, and/or actions (e.g., separating the nuts from the trail mix due to food allergies).</p> <p>IN 5.3    Communicate the results of an investigation using words, symbols, pictures, objects, and/or actions (e.g., using data tables and/or graphs).</p> <p>IN 5.4    Communicate explanations using words, symbols, pictures, objects, and/or actions.</p>

## Strand 8: Impacts of Science, Technology, and Human Activity (ST)

Big Idea	Concept	Alternate Performance Indicators (APIs)	
<p style="text-align: center;"><b>1.</b> The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.</p>	<p style="text-align: center;"><b>A</b> Designed objects are used to do things better or more easily and to do some things that, otherwise, could not be done at all.</p>	ST 1.1	Explore objects that occur in nature in their natural environments (e.g., soil, rock, trees, and/or water).
		ST 1.2	Explore objects that have been designed and made by people (e.g., houses, cars, airplanes, pencils, and/or telephones).
		ST1.3	Engage in an activity with objects that occur in nature and are made by man (e.g., putting bird seed in a manmade bird feeder).
		ST 1.4	Identify objects that occur in nature.
		ST 1.5	Identify objects that have been designed and/or made by people to solve human problems (e.g., wheels and books) and/or to enhance quality of life (e.g., wheelchairs and elevators).
		<b>ST 1.6</b>	<b>Explore how technological improvements lead to changes in everyday life (e.g., microwaves are faster than conventional ovens; transportation; assistive technology; computers; and/or Velcro on sneakers).</b>
	<p style="text-align: center;"><b>B</b> Technological solutions to problems often have drawbacks as well as benefits.</p>	ST 2.1	Identify positive and/or negative effects of communication technologies (e.g., Positive: mobile phones can be used during an emergency in remote areas; Negative: using a mobile phone while driving a car can be dangerous).
		ST 2.2	Identify positive and/or negative effects of transportation technologies (e.g., Positive: cars, trains, and airplanes can reduce travel and shipping time; Negative: types of transportation can increase noise and air pollution).
		ST 2.3	Identify the effects in the advances of weather observation and prediction (e.g., Doppler radar offers early warning of potential storms; satellite images contribute to the forecast to help farmers plant and harvest crops).

Big Idea	Concept	Alternate Performance Indicators (APIs)
<p><b>3.</b> Science and technology affect, and are affected by, society.</p>	<p><b>A</b> People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done.</p>	<p>ST 3.1 Engage in an activity that uses scientific discoveries and technological advances which enhance the quality of human life (e.g., wheelchairs, switches, and/or assistive technologies).</p> <p>ST 3.2 Identify scientific discoveries and technological advances which enhance the quality of human life (e.g., wheelchairs, switches, and/or assistive technologies).</p>
	<p><b>B</b> Social, political, economic, ethical, and environmental factors strongly influence, and are influenced by, the direction and progress of science and technology.</p>	<p>ST 4.1 Explore science and technology as it pertains to improving the environment (e.g., can crushers and/or refillable dispensers).</p> <p>ST4.2 Identify the scientific technology used to overcome physical limitations (e.g., wheelchairs, restroom handrails, adaptive utensils, and/or touch screen computers).</p> <p>ST 4.3 Identify solutions to environmental problems using scientific technology (e.g., rechargeable batteries, recycling, and/or composting).</p>