

Content Standard: ALGEBRAIC REASONING: PATTERNS AND FUNCTIONS

Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.

Guiding Question:

How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

Students in K-12 should understand and describe patterns and functional relationships.

Pre-K	K	1
<p>Students in Pre-kindergarten should sort and classify objects by an attribute.</p> <p>(1) Extend and compare arithmetic and geometric sequences. (2) Represent geometric and numeric patterns using words, tables, graphs and equations. (3) Analyze patterns and data to make generalizations and predictions.</p>	<p>Students in Kindergarten should sort and classify objects using attributes</p> <p>(Alg.K.1) Sort and classify objects by size, shape, color, texture, use, position and orientation <i>(position: place in space, orientation: placement or direction of object in space, for example, creating a pattern with single colored links in which the position of the hole changes, or making a pattern in which students face forward or backward)</i> and describe the reason for action.</p>	<p>Students in grade 1 should examine attributes of objects and describe their relationships.</p> <p>(1) Sort, classify and order objects and numbers based on one and two attributes and describe the rule used. (2) Recognize, extend, describe and create a variety of patterns, and translate the same pattern from one representation (such as color) to another representation (such as shape). (3) Describe counting patterns and number patterns. (4) Develop and test generalizations based on observations of patterns and relationships.</p>

<p style="text-align: center;">Pre-K</p> <p>Students in Pre-kindergarten should describe and extend patterns using the attributes of various objects.</p> <p>(1) Recognize, copy, extend and create simple auditory and physical patterns using a variety of materials in different contexts.</p>	<p style="text-align: center;">K</p> <p>Students in Kindergarten should identify a pattern and describe the rule using the physical attributes or position of objects in a sequence.</p> <p>(Alg.K.2) Recognize, copy and extend patterns of sounds, colors, shapes, textures and numbers in a variety of contexts and describe the rule of the pattern (Alg.K.3) Make comparisons and describe qualitative and quantitative changes of a given pattern (more, less, bigger, smaller, longer, one more, one less).</p>	
<p>Students in K-12 should represent and analyze quantitative relationships in a variety of ways.</p>		
		<p style="text-align: center;">1</p> <p>Students in grade 1 should represent the result of counting, combining and separating sets of objects using number sentences.</p> <p>(1) Model real-life situations that involve addition and subtraction of whole numbers using objects, pictures and open sentences.</p>

Students in K-12 should use operations, properties and algebraic symbols to determine equivalence and solve problems.

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Students in grade 1 should identify quantities as equivalent or non-equivalent.

(1) Demonstrate balance or equivalence using models.

Content Standard: NUMERICAL AND PROPORTIONAL REASONING

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.

Guiding Question:

How are quantitative relationships represented by numbers?

Students in K-12 should understand that a variety of numerical representations can be used to describe quantitative relationships.

Pre-K	K	1
<p>Students in Pre-kindergarten should use numbers to count, order and compare.</p> <p>(1) Count and identify the number of objects in a set. (2) Compare sets and identify those with more, less and the same amounts. (3) Describe the position of objects using the terms first and last.</p>	<p>Students in Kindergarten should use numbers to count, order, compare, label, locate and measure.</p> <p>(Num.K.1) Use numbers to locate, order, label and measure. (Num.K.2) Identify the numerals 1-10 and match sets of objects to the numerals. (Num.K.3) Compare sets using the terms “more,” “less” or “the same” and order sets from least to greatest. (Num.K.4) Identify ordinal position of objects, first through fifth, and last. (Num.K.5) Act out story problems and solve practical problems using objects. (Num.K.6) <i>Identification of number words to ten.</i> (Num.K.7) <i>Exploration of written numerals in order from 1- 10.</i></p>	<p>Students in grade 1 should represent and order two-digit numbers as groups of tens and ones in the base ten place value system..</p> <p>(1) Estimate and describe quantity with benchmark amounts such as 0, 10 and 100. (2) Represent two-digit numbers on number lines and using models. (3) Determine and compare values and trade with sets of pennies and dimes. (4) Identify ordinal position of objects, first through tenth</p>

<p align="center">Pre-K</p> <p>Students in Pre-kindergarten should share equal parts of a whole object.</p> <p>(1) Explore a whole and half of an object.</p>	<p align="center">K</p> <p>Students in Kindergarten should share equal parts of an object.</p> <p>(Num.K.8) Use a variety of models to identify a whole and a half of an object. (Num.K.9) Compare two parts of a whole and describe the parts as closer to a whole, or closer to very little. (Num.K.10) Recognize that two halves can be put together to make a whole.</p>	<p align="center">1</p> <p>Students in grade 1 should identify and compare equal parts of a whole.</p> <p>(1) Identify and represent $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ of a whole and identify portions that are not halves, thirds or fourths. (2) Compare parts of a whole object and estimate whether they are closer to a very little, one half or one whole. (3) Make a whole of equal-sized parts of familiar objects.</p>
	<p>Students in Kindergarten should share a set of objects that is divided into groups with equal amounts.</p> <p>(Num.K.11) Share a set of objects considered to be a whole by forming two smaller sets that have equal amounts.</p>	<p>Students in grade 1 should partition a set of objects into smaller groups with equal amounts.</p> <p>(1) Identify half of a small set of objects considered to be the whole.</p>
		<p>Students in grade 1 should describe relationships between quantities using ratios.</p> <p>(1) Describe patterns with simple ratios using familiar contexts, such as 1 cat has 4 legs, 2 cats have 8 legs.</p>

Students in K-12 should use numbers and their properties to compute flexibly and fluently and to reasonably estimate measures and quantities.		
Pre-K	K	1
<p>Students in Pre-kindergarten should count, adding one or more to the previous amount.</p> <p>(1) Count by rote, 1 to 10 (2) Count as one more object is added to a set of objects.</p>	<p>Students in Kindergarten should count, adding one more to the previous number, and group and count by ones and tens.</p> <p>(Num.K.12) Count to and past 10 to 20, then to 30, and group and count objects by 10. (<i>explore rote count to 100</i>). (Num.K.13) Estimate the amount of objects in a set using 10 as a benchmark, and then count to determine if the amount is more or less than 10. (Num.K.14) Identify sets and numbers, which are equal and one more. (Num.K.15) Recognize and name pennies (<i>nickels</i>) and dimes; count and trade pennies for objects.</p>	<p>Students in grade 1 should count by groups, add one more to the grouping and compare values of groups.</p> <p>(1) Count whole numbers to 100. (2) Identify, read and write numerals to 100 and beyond. (3) Group and skip count by 2s, 5s and 10s. (4) Count on from a given amount, orally and with models, and count back from 10. (5) Identify 1 more and 1 less and explore 10 more and 10 less than a number.</p>
		<p>Students in grade 1 should add by counting and combining and subtract by separating, comparing or counting on.</p> <p>(1) Write number sentences and use objects and pictures to model and solve addition and subtraction story problems. (2) Develop, describe and use a variety of strategies to add and subtract one-digit numbers. (3) Explore finding the sum of two two-digit</p>

		numbers using models and counting strategies. (4) Identify reasonable answers to problems that reflect real-world experiences.

GEOMETRY AND MEASUREMENT

Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.

Guiding Question:

How do geometric relationships and measurements help us to solve problems and make sense of our world?

Students in K-12 should use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.

Pre-K

Students in Pre-kindergarten should identify and sort shapes and solids by physical characteristics.

- (1) Identify and sort simple shapes such as square, rectangle, triangle and circle, and solids such as cube, cylinder, sphere and prism.
- (2) Use a variety of materials to construct various shapes and describe their physical attributes.

K

Students in Kindergarten should identify and sort shapes and solids by physical characteristics.

- (GeoMeas.K.1) Sort, order, compare and use comparative language to describe small sets of objects sequenced by size, length, area and volume.
- (GeoMeas.K.2) Identify, sort and compare two- and three-dimensional shapes and solids in the environment, such as triangles, squares, rectangles, circles, cubes, spheres, cylinders and cones.
- (GeoMeas.K.3) Use a variety of materials to create geometric shapes and solids and build copies of simple shapes and designs by direct observation and by visual memory.

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Students in grade 1 should classify shapes and solids by common characteristics.

- (1) Sort, build, name and draw two- and three-dimensional objects.
- (2) Use a variety of materials to create two- and three-dimensional designs and copy them from visual memory.
- (3) Create and explore shapes and designs with a line of symmetry.

Students in K-12 should use spatial reasoning, location and geometric relationships to solve problems.		
Pre-K	K	1
<p>Students in Pre-kindergarten should use positional language to describe location, direction and position of objects.</p> <p>(1) Use positional language – e.g., under, over, inside, next, near, in front – to describe position and order. (2) Complete simple shape and jigsaw puzzles.</p>	<p>Students in Kindergarten should use positional language to describe location, direction and position of objects.</p> <p>(GeoMeas.K.4) Describe the position, location and direction of objects, or parts of objects, using terms such as inside, outside, top, bottom, close, closer, etc.</p>	<p>Students in grade 1 should describe, name and interpret direction and position of objects.</p> <p>(1) Indicate relative position, direction and location with terms such as inside, outside, top, bottom, left and right.</p>
Students in K-12 should develop and apply units, systems, formulas and appropriate tools to estimate and measure.		
Pre-K	K	1
<p>Students in Pre-kindergarten should sequence events during a limited time period.</p> <p>(1) Describe time periods or a sequence of events using terms such as morning, afternoon and night or yesterday, today and tomorrow.</p>	<p>Students in Kindergarten should use calendars and clocks to measure and record time.</p> <p>(GeoMeas.K.5) Locate a date on the calendar (yesterday, today and tomorrow) and sequence events using terms like before and after.</p>	<p>Students in grade 1 should plan and sequence events.</p> <p>(1) Estimate and compare the length of time needed to complete tasks using terms such as longer or shorter. (2) Use the calendar to identify dates, days, weeks and months and to plan and sequence events. (3) Tell time to the hour with analog and digital clocks.</p>

<p style="text-align: center;">Pre-K</p> <p>Students in Pre-kindergarten should use nonstandard units to estimate measures of length, area and capacity.</p> <p>(1) Use nonstandard units and body referents to compare and estimate length, area and capacity. (2) Sort, estimate and order objects by length or area using comparative language such as more, longer, shorter, taller or bigger to describe relationships.</p>	<p>Students in Kindergarten should use nonstandard units to estimate measures of length, area, temperature, weight and capacity.</p> <p>(GeoMeas.K.6) Estimate the number of objects in a handful, and then count to verify. (GeoMeas.K.7) Estimate the amount of objects in a set using benchmarks of 10, and count to determine if the estimate is more or less. (GeoMeas.K.8) Explore, describe and discuss strategies to estimate length, area, temperature and weight using nonstandard units to compare. (GeoMeas.K.9) Explore using everyday objects as nonstandard units to measure length, area and capacity. (GeoMeas.K.10) Compare the weight of two objects using a balance scale and identify which is heavier.</p>	<p>Students in grade 1 should estimate length, area, volume, weight and temperature using nonstandard units.</p> <p>(1) Use physical referents to make estimates and to determine and describe the reasonableness of answers to measurement problems. (2) Use estimation, physical referents and nonstandard units to sort and compare objects.</p>
		<p>Students in grade 1 use standard units of measure to communicate measurement in a universal manner.</p> <p>(1) Explore using the standard units of inch and centimeter to estimate and measure length.</p>

<p>Content Standard: WORKING WITH DATA: PROBABILITY AND STATISTICS Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.</p>		
<p>Guiding Question: How can collecting, organizing and displaying data help us analyze information and make reasonable predictions and informed decisions?</p>		
<p>Students in K-12 should collect, organize and display data using appropriate statistical and graphical methods.</p>		
<p>Pre-K</p> <p>Students in Pre-kindergarten should make comparisons from information displayed in real graphs.</p> <p>(1) Collect, describe, organize, sort and display objects and pictures in real graphs.</p>	<p>K</p> <p>Students in Kindergarten should visualize information and make comparisons about information displayed in real and picture graphs.</p> <p>(Data.K.1) Pose questions about personal information, experiences and environment. (Data.K.2) Explore ways to record and organize data using tallies and tables. (Data.K.3) Construct real graphs and picture graphs and describe the data using the terms more, less and same. (Data.K.4) Organize information through systematic counting, sorting, making lists (<i>example- schedule, brainstorming, voting, categorizing</i>) and graphic organizers.</p>	<p>1</p> <p>Students in grade 1 should collect, organize, record and describe data.</p> <p>(1) Pose questions and collect, organize, record and describe data using tallies, tables, real graphs, picture graphs, glyphs (coded pictures) and bar graphs.</p>

Students in K-12 should analyze data sets to form hypotheses and make predictions.		
	<p>Students in Kindergarten should extend different types of patterns and make predictions.</p> <p>(Data.K.5) Identify visual, auditory and physical patterns and extend to make predictions.</p>	<p>Students in grade 1 should organize data in tables and graphs and make comparisons of the data.</p> <p>(1) Use various methods to organize information including lists, systematic counting, sorting, graphic organizers and tables. (2) Use comparative language to describe the data in tables and graphs.</p>
Students in K-12 should understand and apply basic concepts of probability		
Pre-K	K	1
<p>Students in Pre-kindergarten should determine when events are likely to happen again.</p> <p>(1) Use patterns to describe some events that repeat. (2) Identify events related to personal experiences as likely or unlikely to happen.</p>	<p>Students in Kindergarten should observe the frequency of real-world events and identify the likelihood of future events.</p> <p>(Data.K.6) Describe the likelihood of events related to personal experiences. (Data.K.7) Engage in simple probability activities and discuss the results.<i>(example-fair v. unfair, spinners in caterpillar game, story problems, fractional pieces)</i></p>	<p>Students in grade 1 should determine the likelihood of certain events through simple experiments and observations of games.</p> <p>(1) Observe, record, graph and describe the results of simple probability activities and games. (2) Describe and explain the likelihood of various events in the students' world.</p>

