Pre-Kindergarten
GEOMETRY AND MEASUREMENT
Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools, and technology.

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

Students should…	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems.	a **Identify shapes** and **Identify solids** by physical characteristics. **Sort shapes** and **Sort solids** by physical characteristics.	**(1) Identify** and **Sort** simple shapes such as • square, • rectangle, • triangle, • circle. **Identify** and **Sort** simple solids such as • cube, • cylinder, • sphere and • prism. **(2) Use a variety of materials** • to construct various shapes and • to describe their physical attributes.
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. Use positional language to describe • location [of objects?], • direction, and • position of objects.	**(1) Use positional language**—e.g. UNDER, OVER, INSIDE, NEXT, NEAR, IN FRONT— • to describe position & • to describe order. **(2)** Complete simple shape puzzles and jigsaw puzzles.

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3.3 **Develop** and **Apply**
• units
  o to estimate and
  o to measure
• systems
  o to estimate and
  o to measure
• formulas
  o to estimate and
  o to measure
• appropriate tools
  o to estimate and
  o to measure.
	a. Sequence events during a limited time period.	**(1) Describe time periods** or **Describe a sequence of events** using terms such as
		• morning, afternoon, night or
		• yesterday, today and tomorrow.

	b. Use nonstandard units to estimate measures of • length, • area and • capacity.	**(1) Use nonstandard units** and **Use body referents** • to compare length • to estimate length • to compare area, • to estimate area, • to compare capacity • to estimate capacity. **(2) Sort objects** and **Estimate objects** and **Order objects** by LENGTH or by AREA using comparative language such as • more, • longer, • shorter, • taller or • bigger to describe relationships.

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3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. Use positional language to describe • location [of objects?], • direction, and • position of objects.	**(1)** Describe the **position** and **location**, and **direction** of objects using terms such as INSIDE, OUTSIDE, TOP, BOTTOM, CLOSE, CLOSER, etc. Describe the **position** and **location**, and **direction** of parts of objects using terms such as INSIDE, OUTSIDE, TOP, BOTTOM, CLOSE, CLOSER, etc.
3.3 **Develop** and **Apply** • units o to estimate and o to measure • systems o to estimate and o to measure • formulas o to estimate and o to measure • appropriate tools o to estimate and o to measure.	a. **Use calendars** and **Use clocks** •to measure time and •to record time.	**(1)** Locate a date on the calendar • (yesterday, • today, and • tomorrow) Sequence events using terms like • before and • after.
	b. Use nonstandard units to estimate measures of • length • area • temperature • weight • capacity	**(1) Estimate** the number of objects in a handful, and then **count** to verify. **(2) Estimate** the amount of objects in a set using benchmarks of 10, and **Count** to determine if the estimate is more or less. **(3) Explore** strategies, **Describe strategies**, and **Discuss strategies** to estimate • length using nonstandard units to compare • area using nonstandard units to compare • temperature using nonstandard units to compare • weight using nonstandard units to compare

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Students should…	Performance Standards	Expected Performances
3.3 Continued: **<u>Develop</u>** and **<u>Apply</u>** units, systems, formulas and appropriate tools to estimate and measure.	b Continued: Use nonstandard units to estimate measures of • length • area • temperature • weight • capacity	**(4)** Explore using everyday objects as nonstandard units to measure • length • area • capacity **(5) Compare** the weight of two objects using a balance scale and and **Identify** which object is heavier

Grade One
GEOMETRY AND MEASUREMENT
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Students should…	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems.	a. **Classify shapes** and **Classify solids** by common characteristics.	**(1) Sort** and **Build** and **Name** and **Draw** • two-dimensional objects and • three-dimensional objects. **(2) Use** a variety of materials • to create two-dimension design • to create three-dimensional designs • to copy 2-D designs from visual memory • to copy 3-D designs from visual memory. **(3) Create** and **Explore** • shapes with a line of symmetry • designs with a line of symmetry.
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. **Describe** and **Name** and **Interpret** • direction and • position of objects.	**(1)** Indicate **relative position** and **direction** and **location** with terms such as INSIDE, OUTSIDE, TOP, BOTTOM, LEFT and RIGHT.

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Students should…	Performance Standards	Expected Performances

3.3 **Develop** and **Apply**
• units
  o to estimate and
  o to measure
• systems
  o to estimate and
  o to measure
• formulas
  o to estimate and
  o to measure
• appropriate tools
  o to estimate and
  o to measure.
	a. Plan events. Sequence events.	**(1)** **Estimate the length** of time needed to complete tasks and **Compare the length** of time needed to complete tasks using terms such as
		• longer or
		• shorter
		(2) Use the calendar to
		• identify dates,
		• identify days,
		• identify weeks,
		• identify months
		• to plan events and
		• to sequence events.
		(3) Tell time to the hour
		• with analog clocks
		• with digital clocks

	b. Use nonstandard units to estimate • length • area • volume • weight • temperature	**(1)** Use physical referents • **to make estimates** to measurement problems • **to determine** the reasonableness of answers to measurement problems • **to describe** the reasonableness of answers to measurement problems
	c. Use **standard units** of measure to communicate measurement in a universal manner.	**(1)** Explore using the **standard unit of inch** and the **standard unit of centimeter** • to estimate length • to measure length

Grade 2 **GEOMETRY AND MEASUREMENT** Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools, and technology.		
How do geometric relationships and measurements help us to solve problems and make sense of our world?		
Students Should...	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems.	a. Identify shapes as the same when there are changes in position.	**(1) Explore translations** (slides) and **Explore reflections** (flips) and **Explore rotations** (turns) of simple polygons using manipulative materials. **(2) Build shapes** and **Identify shapes** • that have one or more lines of reflective symmetry or • that can be divided into two congruent parts. **(3)** Explore filling a two-dimensional region with different shapes.
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. **Recognize** and **Use** geometric relationships to solve problems.	**(1) Explore combining polygons** and **Explore subdividing polygons** with manipulative materials Reconstruct polygons from visual memory. **Explore combining solids** and **Explore subdividing solids** with manipulative materials Reconstruct solids them from visual memory.

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Grade 2
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Students Should…	Performance Standards	Expected Performances
3.2 Continued: **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. Continued: **Recognize** and **Use** geometric relationships to solve problems.	**(2) Build** and **Describe** and **Draw** and **Identify** • polygons • other two-dimensional objects found in the environment • solids • other three-dimensional objects found in the environment
3.3 **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	a. **Estimate** and **Measure** the length of time to complete • activities and • tasks	**(1)** Use the calendar TO WRITE problems involving time. Use the calendar TO SOLVE problems involving time. **(2) Tell time** to the half-hour. **Explore** time to the quarter-hour using • analog clocks • digital clocks
	b. Measure through • direct comparison • repetition of units	**(1) Develop** and **Use** • nonstandard referents o to **estimate** and to **measure** ▪ length ▪ area ▪ weight ▪ capacity ▪ volume • standard benchmarks o to **estimate** and to **measure** ▪ length ▪ area ▪ weight ▪ capacity ▪ volume **(2)** Identify reasonable estimates and Describe the strategies used to determine the estimates.

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Grade 2 **GEOMETRY AND MEASUREMENT** Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools, and technology.		
How do geometric relationships and measurements help us to solve problems and make sense of our world?		
Students Should…	Performance Standards	Expected Performances
3.3 Continued: Develop and apply units, systems, formulas and appropriate tools to estimate and measure.	b. Continued: Measure through • direct comparison • repetition of units	**(3)** Explore using measurement tools such as • thermometers to measure temperature • basic rulers to measure length • balance scales to measure weight

Grade 3
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Students Should...	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems	a. **Classify** and **Compare** • polygons using various attributes • solids using various attributes	**(1) Sort polygons** and **Sort solids** through using characteristics such as • the relationship of sides o parallel o perpendicular • kinds of angles o acute o right o obtuse • symmetry • congruence **(2) Describe similarities** and **Describe differences** • of 2-dimensional shapes in the environment using physical features such as o number of sides o number of angles o lengths of sides o straight and curved parts • of 3-dimensional shapes in the environment using physical features such as o number of sides o number of angles o lengths of sides o straight and curved parts **(3)** Investigate ways **to tile** or **to tessellate** • a region using various polygons • a shape using various polygons

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Students Should...	Performance Standards	Expected Performances
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. Represent location on simple maps.	**(1) Draw simple maps** and **Interpret simple maps** using • coordinate systems and • shapes or • pictures
3.3 **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	a. Plan events and Make schedules.	**(1)** Tell time to the minute • using analog clocks • using digital clocks Identify AM and PM **(2) Use calendars** and **Use clocks** • to play events • to sequence events

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Students Should…	Performance Standards	Expected Performances
3.3Continued: **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	b. **Determine** and **Use** • different tools appropriate for specific measurement tasks. • different units appropriate for specific measurement tasks.	**(1) Develop strategies** and **Explain strategies** for using • NONSTANDARD REFERENTS to estimate measurements of o length o area o weight o temperature o volume and o capacity • STANDARD REFERENTS to estimate measurements of o length o area o weight o temperature o volume and o capacity **(2)** Explore strategies **for estimating** and **for measuring** the • perimeters of irregular shapes • areas of irregular shapes • [*surface?]* areas of solids • volumes of solids **(3) Describe estimation strategies** and **Use estimation strategies** that can identify a reasonable answer to a measurement problem when an estimate is appropriate.

Grade 4
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Students Should...	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems	a. Describe geometric properties of • polygons and • solids.	**(1) Build** and **Draw** and **Describe** and **Classify** • 2-dimensional figures • 3-dimensional figures **(2)** Analyze 2-dimensional shapes and Determine • lines of symmetry and • congruence **(3)** Identify • translations [*slides*] in geometric designs • reflections [*flips*] in geometric designs • rotations [*turns*] in geometric designs
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a Find possible pathways between two points using maps that are based on the rectangular coordinate system.	**(1)** Create maps and Read maps and Use coordinate systems to specific locations.

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Students Should...	Performance Standards	Expected Performances
3.3 **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	a. Recognize that patterns exist between **measurements of length** and **perimeter** and **area of squares and rectangles**.	**(1)** Explore converting • inches to feet and • feet to yards **(2)** Solve practical problems that involve • estimation of length • measurement of length • perimeter • area • volume • capacity • weight and • temperature. **(3)** Explore relationships between the **lengths of sides of rectangles** AND **their areas and perimeters** and Generalize the patterns as simple formulas.

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Students Should…	Performance Standards	Expected Performances
3.3 Continued: **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	b. Make precise measurement and Use benchmarks to estimate measures.	**(1) Identify** and **Use** the appropriate CUSTOMARY units and tools for measuring • length • perimeter • area • weight • time • temperature • volume and • capacity **Identify** and **Use** the appropriate METRIC units and tools for measuring • length • perimeter • area • weight • time • temperature • volume and • capacity **(2)** Explore converting from one unit to another when measuring time and Solve problems that involve elapsed time using • clocks and • calendars **(3)** Use estimation to predict reasonable answers to measurement problems. **(4) Estimate** and **Draw** and **Measure length** • to the nearest inch • to the nearest half-inch • to the nearest centimeter

Grade 5
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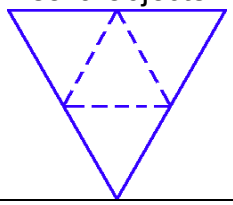
Students Should...	Performance Standards	Expected Performances
3.1 **Use properties** and **Use characteristics** of • two-dimensional shapes to o describe relationships o communicate ideas o solve problems • three-dimensional shapes to o describe relationships o communicate ideas o solve problems • geometric theorems to o describe relationships, o communicate ideas and o solve problems	a. Use geometric relationships • to describe polygons • to describe solids	**(1)** Use geometric relationships such as • parallel • perpendicular • congruent to describe the attributes of • sets of shapes • sets of solids • subsets of shapes • subsets of solids **(2) Make conjectures** and **Test conjectures** about geometric relation-ships.
	b. Recognize that Changes in the perimeter of a polygon may affect its area and Changes in area may affect the perimeter	**(1)** Explore the relationship between area and perimeter when the dimensions of a polygon change. **(2)** Develop formulas to find the PERIMETER of • squares • rectangles • triangles Develop formulas to find the AREA of • squares • rectangles • triangles
3.2 **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	a. **Identify** and **Describe** and **Build** nets for • solid figures • solid objects. 	**(1)** Represent the surface of 3-dimensional objects through the use of 2-dimensional nets **(2) Investigate strategies** and **Develop strategies** to determine the volume of rectangular solids.

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Students Should…	Performance Standards	Expected Performances
3.2 Continued: **Use spatial reasoning** and **Use location** and **Use geometric relationships** to solve problems.	b. Determine geometric relationships through spatial visualization [*Spatial visualization helps to build mental images that describe the results of a series of motions*]	**(1)** Plot points on the rectangular coordinate system and **Estimate** and **Determine** the volume of rectangular solids.
3.3 **Develop** and **Apply** • units o to estimate & o to measure • systems o to estimate & o to measure • formulas o to estimate & o to measure • appropriate tools o to estimate & o to measure.	a. Solve problems in the **measure of time** • in the customary system using specific ratios • in the metric system using specific ratios. Solve problems in **converting units of length** • in the customary system using specific ratios • in the metric system using specific ratios.	**(1)** Solve length problems involving conversion of measures within • customary systems • metric systems **(2)** Solve problems involving the conversion of measures of • time • elapsed time (DAYS, HOURS, MINUTES, SECONDS) **(3)** Estimate to measure [*before measuring?*] Choose appropriate units and tools to measure and Solve a variety of problems involving • length • perimeter • area • volume • capacity • mass • time • temperature • AND ANGLE