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Kindergarten

Sample Tasks for PreK-8, developed by New York State teachers, are clarifications, further explaining the language and intent of the associated Performance Indicators. These tasks are not test items, nor are they meant for students' use.

Strands

Process	Content
Problem Solving	Number Sense and Operations
Reasoning and Proof	Algebra
Communication	Geometry
Connections	Measurement
Representation	Statistics and Probability

Problem Solving Strand

Students will build new mathematical knowledge through problem solving.

K.PS.1 Explore, examine, and make observations about a social problem or mathematical situation

K.PS.1a
Have four students sit in one group and nine students sit in another. Ask the students to determine which group has more students simply by looking at the groups, with no counting. Then together count to determine how many students are in each group. Have the two groups stand in lines next to each other as in a graph. Match up the four students in the first group with four of the nine students in the second group. Count the remaining students to show that there are 5 more students in the group of nine.

K.PS.2 Interpret information correctly, identify the problem, and generate possible solutions

K.PS.2a
Show students examples of four different symetrical paper kites. Explain symetry, using kites with 2 and 3 dimentional shapes. Ask the students to compare the symmetrical designs of the kites.

Students will solve problems that arise in mathematics and in other contexts.

K.PS.3 Act out or model with manipulatives activities involving mathematical content from literature and/or story telling

K.PS.3a
Ask students to act out various activities they might participate in during the morning (e.g., eating breakfast, brushing their teeth, waking up, going to school). Repeat this process for activities they might participate in around noon, in the afternoon, in the evening and at night. Have students take turns telling stories of what a child does during a day. Ask the other students to act out the story.

K.PS.4 Formulate problems and solutions from everyday situations (e.g., counting the number of children in the class, using the calendar to teach counting).

K.PS.4a
Have students draw individual pictures of a dog, cat, bird, and chicken and cut apart the individual pictures and sort them into boxes. As a class, create a pictograph by having students decide how many of each picture should be placed on the graph. For example, the class may decide that the pictograph should have 5 dogs, 4 cats, 3 birds, and 2 chickens.

Students will apply and adapt a variety of appropriate strategies to solve problems.

K.PS.5 Use informal counting strategies to find solutions

K.PS.5a
Have small groups of students stand up before the class. Count the students and have the rest of the class write the correct numbers to show how many students are standing. If possible, before using pencil and paper to write a new numeral, allow students to *write* the numerals in a sand table with the non-brush end of a dry paintbrush. Then guide the students to paint the numeral using water first and then paint. Finally, guide the students to use a pencil and paper to write the numeral.

K.PS.6 Experience teacher-directed questioning process to understand problems

K.PS.6a
Ask students questions such as the following:

> Maria has 5 pieces of candy. Juan gives Maria 3 more pieces of candy. How many pieces of candy does Maria have now? (Guide students to start with 5 and simply count up 3 more to 8.)
>
> Jacob has 10 toy cars. Jacob gives 4 cars to Mike. How many cars does Jacob have left? (Guide students to count backward from 10 to 6.)

Give students opportunities to make up their own verbal word problems.

K.PS.7 Compare and discuss ideas for solving a problem with teacher and/or students to justify their thinking

K.PS.7a
Place five objects of varying height on a desk in front of the room. Ask students to describe how to sort the objects by size. Discuss increasing and decreasing size, changing the order from small to large, then large to small.

K.PS.8 Use manipulatives (e.g., tiles, blocks) to model the action in problems

K.PS.8a
Give each student in the class a set of interlocking cubes (between 5 and 10 for each student). Ask the students to create something using the cubes. Have them count the number of interlocking cubes they used in their creations, telling the last counting word.

K.PS.9 Use drawings/pictures to model the action in problems

K.PS.9a
Create an ABAAB growing pattern with yellow and red links. Guide students to identify it as an ABAAB growing pattern. Give students an opportunity to use other sorting objects to create their own ABAAB growing patterns. Have students draw a picture of their patterns for a "growing pattern" bulletin board.

K.PS.10 Explain to others how a problem was solved, giving strategies

Students will monitor and reflect on the process of mathematical problem solving.

K.PS.10a
Create several patterns of 3 attributes with small, medium, and large circles of different colors. For example:

2 blue circles
2 red circles
2 green circles
3 large circles
3 medium circles
3 small circles

Give students small, medium, and large shapes and ask them to create their own pattern. Have students explain how they decided what came next in their pattern.

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Reasoning and Proof Strand

Students will recognize reasoning and proof as fundamental aspects of mathematics.

K.RP.1 Understand that mathematical statements can be true or false

K.RP.1a
Give each student a set of 12 connecting cubes. Ask each student to make a tower of 10 cubes.

Students will make and investigate mathematical conjectures.

K.RP.2 Investigate the use of knowledgeable guessing as a mathematical tool

K.RP.2a
Have students sit in a circle and pass a beanbag around the circle as they count to 20. Each pass counts as one. Ask the students to guess who will be holding the beanbag at 20. Keep repeating the process so that every student gets the opportunity to pass the beanbag.

K.RP.2b
Provide students with a variety of materials such as a paper clip, a marker, a pencil, a building block, and a book. Have students choose two objects from the collection. Ask the students to guess which item is longer. Have students cut a piece of string to represent the length of each of the objects. Guide the students to compare the lengths of the two pieces of string to determine which is longer and which is shorter.

K.RP.3 Explore guesses, using a variety of objects and manipulatives

K.RP.3a
Give each student up to ten different colored squares of paper and the grid shown below. Have students sort their papers by color, drawing one circle in the correct column in the grid representing each paper.

			O		
	O		O		O
O	O	O	O	O	O
red	orange	yellow	green	blue	brown

Have students identify what color was represented the most, the least and the same number of times.

Students will develop and evaluate mathematical arguments and proofs.

K.RP.4 Listen to claims other students make

K.RP.4a
Hide objects in the room and give students positional directions to lead them to the objects. After completing this activity, divide the class into pairs and allow the pairs to hide the objects. Have students use positional directions to guide each other to hidden objects.

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Communication Strand

Students will organize and consolidate their mathematical thinking through communication.

K.CM.1 Understand how to organize their thought processes with teacher guidance

Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

K.CM.2 Share mathematical ideas through the manipulation of objects, drawings, pictures, and verbal explanations

K.CM.2a
Give students pieces of paper in shapes of different colors and sizes. Have students sort the big squares, the small yellow shapes, etc. Then have students suggest their own sorting rules.

K.CM.3 Listen to solutions shared by other students

K.CM.3a
Cut yarn of various colors into different lengths. Give each student a piece of yarn. Pair the children up and ask them to determine which piece of yarn is *longer* and which is *shorter*. Have them share their findings by stating either "My piece of yarn is longer than Matthew's piece of yarn." or "My piece of yarn is shorter than Rachel's piece of yarn." Have the students switch partners many times.

K.CM.4 Formulate mathematically relevant questions with teacher guidance

K.CM.4a
Discuss the following questions:

How do you get to school in the morning?
How can you record this information? (Students might make a chart to record how many children in the class get to school by car, by bus, by bike, by subway, and by walking.)

Students will use the language of mathematics to express mathematical ideas precisely.

K.CM.5 Use appropriate mathematical terms, vocabulary, and language

K.CM.5a
Give students magazines to look through. Make a chart like the one below and ask students to cut out pictures of triangles, squares, circles, and rectangles. Have students glue the items in the correct place on the chart. When the chart is full, discuss the similarities and differences among the shapes.

square	circle
triangle	rectangle

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Connections Strand

Students will recognize and apply mathematics in contexts outside of mathematics.

K.CN.1 Recognize the presence of mathematics in their daily lives

K.CN.1a
After the class has lined up to exit the room, count backwards from 10 together in a whisper to determine when it is time to leave. By zero all students should be standing quietly, waiting to leave the room. Begin with 5 at the start of the school year and work up to 10.

K.CN.2 Use counting strategies to solve problems in their daily lives

K.CN.2a
Have students sit facing a chalkboard or chart paper. Tell the following stories and ask the students to act them out and solve the problems. Ask different students to assist in recording the number sentences.

> Four friends sat together at lunch. (Ask a student to record the beginning number.) Three more friends joined them. (Ask another student to record the second number with the operation sign.)
>
> How many friends are eating lunch together now? (After students determine the number, ask one student to record the number with the equals sign.)
> ---
> Ten friends were outside playing with blocks. (Record number) Three friends went to play in the house. (Record number and operations sign)
>
> How many friends are left playing with the blocks? (Record number with equal sign) Guide students to write- and =.

K.CN.3 Recognize and apply mathematics to objects and pictures

K.CN.3a
Ask students to place ten toy cars in a line as if they were driving down the road. Count together and point to each of the cars in turn, first through tenth. Then ask the students to point to the first car, second car, etc., in turn. Then ask them to point to the second, fifth, and tenth car, out of order.

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Representation Strand

Students will create and use representations to organize, record, and communicate mathematical ideas.

K.R.1 Use multiple representations, including verbal language, acting out or modeling a situation, and drawing pictures as representations

K.R.1a
Make a ten-page number book for each student. Have the students create a cover for their own number book. Give verbal directions for students to draw one circle on the first page, two triangles on the second, three suns on the third, etc.

K.R.2 Use standard and nonstandard representations

K.R.2a
Divide the class into small groups. Provide each group with a small sampling of geometric blocks. Hold up a rectangular block in a vertical position. Ask the students to find the matching block in their sets and hold it up in a horizontal position. Repeat with other blocks.

Students will use representations to model and interpret physical, social, and mathematical phenomena.

K.R.3 Use objects to show and understand physical phenomena (e.g., guess the number of cookies in a package)

K.R.3a
Give each pair of students a piece of paper and a cup with various amounts of buttons. Ask the students to guess how many buttons are in the cup. Then have the students count the buttons and draw buttons on the paper to match the number of buttons in the cup.

K.R.4 Use objects to show and understand social phenomena (e.g., count and represent sharing cookies between friends)

K.R.4a
Give a pair of students four popsicle sticks and a piece of paper with a line down the middle. Have the students distribute the four sticks evenly between them. Have students draw pictures on the chart that represent how many sticks each of student has and write the correct numeral beside the picture of their sticks.

K.R.5 Use objects to show and understand mathematical phenomena (e.g., draw pictures to show a story problem, show number value using fingers on your hand)

K.R.5b
Divide the class into small groups. Distribute red and blue interlocking cubes to each group.Have students use the blocks to represent their group:

- blue and red shirts in the group
- cat owners and dog owner in the group
- sneakers and non-sneakers in the group
- shirt buttins and no shirt buttons in the group.

K.R.5 Use objects to show and understand mathematical phenomena (e.g., draw pictures to show a story problem, show number value using fingers on your hand)

K.R.5a
Give each student five crayons and ask them to show, using fingers, how many crayons they have.

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Number Sense and Operations Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.

Number Systems

PK.N.1 Count the items in a collection and know the last counting word *tells* how many items are in the collection (1 to 10).

K.N.1a
Give each student in the class a set of interlocking cubes (between 5 and 10 for each student). Ask the students to create something using the cubes. Have them count the number of interlocking cubes they used in their creations, telling the last counting word.

PK.N.2 Count out (produce) a collection of a specified size 1 to 10.

K.N.2a
Give each student a set of 12 connecting cubes. Ask each student to make a tower of 10 cubes.

K.N.3 Numerically label a data set of 1 to 5

K.N.3a
Give a pair of students four popsicle sticks and a piece of paper with a line down the middle. Have the students distribute the four sticks evenly between them. Have students draw pictures on the chart that represent how many sticks each of student has and write the correct numeral beside the picture of their sticks.

K.N.4 Verbally count by ones to 20

K.N.4a
Have students sit in a circle and pass a beanbag around the circle as they count to 20. Each pass counts as one. Ask the students to guess who will be holding the beanbag at 20. Keep repeating the process so that every student gets the opportunity to pass the beanbag.

K.N.5 Verbally count backwards from 10

K.N.5a
After the class has lined up to exit the room, count backwards from 10 together in a whisper to determine when it is time to leave. By zero all students should be standing quietly, waiting to leave the room. Begin with 5 at the start of the school year and work up to 10.

K.N.6 Represent collections with a finger pattern up to 10

K.N.6a
Give each student five crayons and ask them to show, using fingers, how many crayons they have.

K.N. Draw pictures or other informal symbols to represent a spoken number up to 10

K.N.7a
Make a ten-page number book for each student. Have the students create a cover for their own number book. Give verbal directions for students to draw one circle on the first page, two triangles on the second, three suns on the third, etc.

K.N.8 Draw pictures or other informal symbols to represent how many in a collection up to 10

K.N.8a
Give each pair of students a piece of paper and a cup with various amounts of buttons. Ask the students to guess how many buttons are in the cup. Then have the students count the buttons and draw buttons on the paper to match the number of buttons in the cup.

K.N.9 Write numbers 1-10 to represent a collection

K.N.9a
Have small groups of students stand up before the class. Count the students and have the rest of the class write the correct numbers to show how many students are standing. If possible, before using pencil and paper to write a new numeral, allow students to *write* the numerals in a sand table with the non-brush end of a dry paintbrush. Then guide the students to paint the numeral using water first and then paint. Finally, guide the students to use a pencil and paper to write the numeral.

K.N.10 Visually determine how many more or less, and then using the verbal counting sequence, match and count 1-10

K.N.10a
Have four students sit in one group and nine students sit in another. Ask the students to determine which group has more students simply by looking at the groups, with no counting. Then together count to determine how many students are in each group. Have the two groups stand in lines next to each other as in

a graph. Match up the four students in the first group with four of the nine students in the second group. Count the remaining students to show that there are 5 more students in the group of nine.

K.N.11 Use and understand verbal ordinal terms, first to tenth

K.N.11a
Ask students to place ten toy cars in a line as if they were driving down the road. Count together and point to each of the cars in turn, first through tenth. Then ask the students to point to the first car, second car, etc., in turn. Then ask them to point to the second, fifth, and tenth car, out of order.

Students will understand meanings of operations and procedures, and how they relate to one another.

Operations

K.N.12 Solve and create addition and subtraction verbal word problems (use counting-based strategies, such as counting on, 1 to 10)

K.N.12a
Ask students questions such as the following:

Maria has 5 pieces of candy. Juan gives Maria 3 more pieces of candy. How many pieces of candy does Maria have now? (Guide students to start with 5 and simply count up 3 more to 8.)
Jacob has 10 toy cars. Jacob gives 4 cars to Mike. How many cars does Jacob have left? (Guide students to count backward from 10 to 6.)

Give students opportunities to make up their own verbal word problems.

K.N.13 Determine sums and differences by various means

K.N.13a
Have students sit facing a chalkboard or chart paper. Tell the following stories and ask the students to act them out and solve the problems. Ask different students to assist in recording the number sentences.

Four friends sat together at lunch. (Ask a student to record the beginning number.) Three more friends joined them. (Ask another student to record the second number with the operation sign.) How many friends are eating lunch together now? (After students determine the number, ask one student to record the number with the equals sign.)

Ten friends were outside playing with blocks. (Record number) Three friends went to play in the house. (Record number and operations sign)
How many friends are left playing with the blocks? (Record number with equal sign) Guide students to write - and =.

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Algebra Strand

Students will recognize, use, and represent algebraically patterns, relations, and functions.

Patterns, Relations, and Functions

K.A.1 Use a variety of manipulatives to create patterns using attributes of color, size, or shape

K.A.1a
Create several patterns of 3 attributes with small, medium, and large circles of different colors. For example:

2 blue circles
2 red circles
2 green circles
3 large circles
3 medium circles
3 small circles

Give students small, medium, and large shapes and ask them to create their own pattern. Have students explain how they decided what came next in their pattern.

K.A.2 Recognize, describe, extend, and create patterns that repeat (i.e., ABABAB or ABAABAAAB)

K.A.2a
Create an ABAAB growing pattern with yellow and red links. Guide students to identify it as an ABAAB growing pattern. Give students an opportunity to use other sorting objects to create their own ABAAB growing patterns. Have students draw a picture of their patterns for a "growing pattern" bulletin board.

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Geometry Strand

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.

Shapes

K.G.1 Describe characteristics and relationships of geometric objects

K.G.1a
Give students magazines to look through. Make a chart like the one below and ask students to cut out pictures of triangles, squares, circles, and rectangles. Have students glue the items in the correct place on the chart. When the chart is full, discuss the similarities and differences among the shapes.

square	circle
triangle	rectangle

Students will identify and justify geometric relationships, formally and informally.

Geometric Relationships

K.G.2a
Place five objects of varying height on a desk in front of the room. Ask students to describe how to sort the objects by size. Discuss increasing and decreasing size, changing the order from small to large, then large to small.

Students will apply transformations and symmetry to analyze problem solving situations.

Transformational Geometry

K.G.3 Explore vertical and horizontal orientation of objects

K.G.3a
Divide the class into small groups. Provide each group with a small sampling of geometric blocks. Hold up a rectangular block in a vertical position. Ask the students to find the matching block in their sets and hold it up in a horizontal position. Repeat with other blocks.

K.G.4 Manipulate two- and three-dimensional shapes to explore symmetry

K.G.4a
Show students examples of four different symetrical paper kites. Explain symetry, using kites with 2 and 3 dimentional shapes. Ask the students to compare the symmetrical designs of the kites.

Students will apply coordinate geometry to analyze problem solving situations.

Coordinate Geometry

K.G.5 Understand and use ideas such as over, under, above, below, on, beside, next to, and between

K.G.5a
Hide objects in the room and give students positional directions to lead them to the objects. After completing this activity, divide the class into pairs and allow the pairs to hide the objects. Have students use positional directions to guide each other to hidden objects.

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Measurement Strand

Students will determine what can be measured and how, using appropriate methods and formulas.

Units of Measurement

K.M.1 Name, discuss, and compare attributes of length (longer than, shorter than)

K.M.1a
Cut yarn of various colors into different lengths. Give each student a piece of yarn. Pair the children up and ask them to determine which piece of yarn is *longer* and which is *shorter*. Have them share their findings by stating either "My piece of yarn is longer than Matthew's piece of yarn." or "My piece of yarn is shorter than Rachel's piece of yarn." Have the students switch partners many times.

K.M.2 Compare the lengths of two objects by representing each length with string or a paper strip

K.M.2a
Provide students with a variety of materials such as a paper clip, a marker, a pencil, a building block, and a book. Have students choose two objects from the collection. Ask the students to guess which item is longer. Have students cut a piece of string to represent the length of each of the objects. Guide the students to compare the lengths of the two pieces of string to determine which is longer and which is shorter.

K.M.3 Relate specific times such as morning, noon, afternoon, and evening to activities and absence or presence of daylight

K.M.3a
Ask students to act out various activities they might participate in during the morning (e.g., eating breakfast, brushing their teeth, waking up, going to school). Repeat this process for activities they might participate in around noon, in the afternoon, in the evening and at night. Have students take turns telling stories of what a child does during a day. Ask the other students to act out the story.

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Statistics and Probability Strand

Students will collect, organize, display, and analyze data.

Collection of Data

K.S.1 Gather data in response to questions posed by the teacher and students

K.S.1a
Discuss the following questions:

How do you get to school in the morning?
How can you record this information? (Students might make a chart to record how many children in the class get to school by car, by bus, by bike, by subway, and by walking.)

Organization and Display of Data

K.S.2 Help to make simple pictographs for quantities up to 10, where one picture represents 1

K.S.2a
Have students draw individual pictures of a dog, cat, bird, and chicken and cut apart the individual pictures and sort them into boxes. As a class, create a pictograph by having students decide how many of each picture should be placed on the graph. For example, the class may decide that the pictograph should have 5 dogs, 4 cats, 3 birds, and 2 chickens.

K.S.3 Sort and organize objects by two attributes (i.e., color, size, and shape)

K.S.3a
Give students pieces of paper in shapes of different colors and sizes. Have students sort the big squares, the small yellow shapes, etc. Then have students suggest their own sorting rules.

K.S.4 Represent data using manipulatives

K.S.4a
Divide the class into small groups. Distribute red and blue interlocking cubes to each group. Have students use the blocks to represent their group:

- blue and red shirts in the group
- cat owners and dog owner in the group
- sneakers and non-sneakers in the group
- shirt buttins and no shirt buttons in the group.

Analysis of Data

K.S.5 Identify more, less, and same amounts from pictographs or concrete models

K.S.5a
Give each student up to ten different colored squares of paper and the grid shown below. Have students sort their papers by color, drawing one circle in the correct column in the grid representing each paper.

			O		
	O		O		O
O	O	O	O	O	O
red	orange	yellow	green	blue	brown

Have students identify what color was represented the most, the least and the same number of times.

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